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With which is consolidated The Electragist and Electrical Record
Established 1901

Contents

OCTOBER, 1938

3—What Kind o'Folks—*An Editorial*

5—Busses for Welder Loads—*By L. R. Bogardus*
—Concentric construction in the Packard plant.

What Happened at the NECA Convention

8—Contractors in Detroit
—The running story of the sessions.

12—NECA and REA Get Down to Cases
—And contractors register their complaints.

14—Youngstown Makes Range Wiring Pay—*By P. M. Geary*
—Because 12 contractors operate a separate company.

16—Picking Service Customers
—Novel plan uses repair work as a feeder.

17—Public Relations in Industry—*A Feature Section*
—Your industrial customers need help—a new business opportunity.

29—Main St. Lighting—*A Feature Section*
—A study of the Main St. market in your town.

54—Editorials and Back Talk

103—Electrical Maintenance—*A Feature Section*
—Guide Sheets on electric distribution.

Departments

56—Wiring Methods
87—Motor Shops
90—Questions on the Code
92—Questions on Signalling
94—In the News
115—New Literature
124—Equipment News
132—Advertisers' Index

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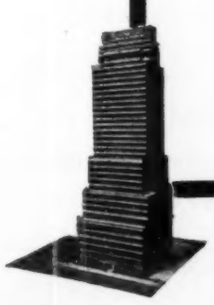

A SERVICE PAPER for electrical contractors, engineers, motor shops, industrial electricians and inspectors, covering engineering, installation, repairing, maintenance and management, in the field of electrical construction—industrial, commercial, and residential.

McGRAW-HILL PUBLISHING COMPANY, INC.
JAMES H. McGRAW, Founder and Honorary Chairman
Publication Office, 99-129 North Broadway, Albany, N. Y.
Editorial and Executive Offices, 330 W. 42nd St., New York, N. Y.

JAMES H. McGRAW, JR. President
HOWARD EHRLICH Executive Vice-President
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Branch Offices: 520 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta. Published monthly, price 25 cents a copy. Vol. 37, No. 10. Subscription rates; U. S., Canada, and Latin-American republics, $2 a year; all other countries, $2.50 a year. Entered as second-class matter August 29, 1936, at Post-office at Albany, N. Y., under the Act of March 3, 1879. Printed in U. S. Copyright 1938, by McGraw-Hill Publishing Company. Cable address: "McGrawhill, New York." Member A.B.P. Member A.B.C.

IN THE SPOTLIGHT

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OCTOBER, 1938

What Kind o' Folks?

AT THE END OF THE CIVIL WAR, my father was a young officer on a Yankee gunboat, up the Roanoke River, in North Carolina. When Lee surrendered, a ship was stationed at every crossing and ferried the bedraggled, heart broken Confederates over the stream. They slept them a night and loaded them with food and started them for home.

ONE MORNING A GAUNT TEXAN, without shoes, said to my Dad—"Hey, Yank! Ef we-uns had a knowed the kind o' folks you-all are, we wouldn't a fit you so long."

THERE IN A WORD is the tragic blunder of war. And so it is in most conflicts of life—and of business. Three cases of it flashed before the NECA Convention last month in Detroit:

1. The contractors and the officials of REA got together and spread out their hard feelings. *We say*—REA has brought incompetent outsiders into rural line construction and farm wiring, has pressured contractors into price cutting, abused us with red tape restrictions and delay. *They say*—Give the farmer new methods, new economies for new conditions.

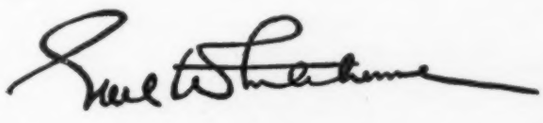
Well, we are finding ways to do it cheaper—and safe. They will learn the value of experience. *The first step is to know and understand each other.*

2. Contractors curse the power companies for giving range wiring to free lance journeymen because they work cheap. Well, Youngstown showed how contractors can organize to do it cheaper still—at a profit. *Again the conflict ends in understanding and adjustment.*

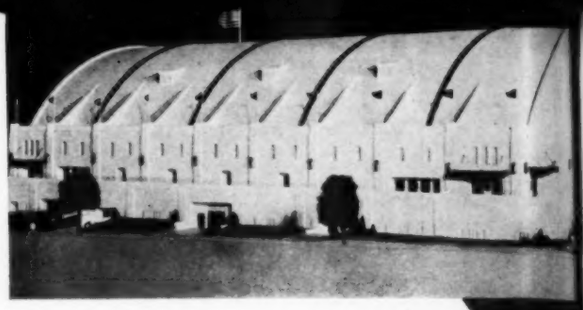
3. Tension over the Code grows more bitter. Power companies are demanding. Inspectors and contractors are defying. But all it needs is tolerance and a bit of good humored ingenuity. For together we can find, by demonstration, what is safe and what is not. *We can, if we will quit fighting each other.*

EVERY MAN HATES TO CHANGE HIS WAYS. He hates all other men who force changes upon him. He will strain and bleed and die rather than accept something that is really better for him in the changing times. It's blind. It's dumb. But that's the way we are.

YET EVOLUTION IS BIGGER THAN THE MAN. Finally he learns his lesson or is destroyed. Our lesson, surely, is to quit the warfare over these industry problems. Both sides sincerely believe they're right. And only the truth can conquer. Once we know the "kind o' folks" we're fighting, the battle will stop.



Youngstown Conduit



SELECTED FOR SAFETY OF HUGE HERSHEY ARENA

The Hershey Sports Arena -- the largest span monolithic concrete structure in America -- is unusual in many respects but entirely regular in one. Its electrical circuits are encased in Youngstown Buckeye Hot Dipped Galvanized Conduit. The scheduled amusement of thousands of spectators is not left to chance when electrical systems are safeguarded by this well known rigid steel electrical conduit.

Buckeye Conduit is preferred by owners, contractors and architects. The ductile lacquer lining provides a smooth raceway through which wires can be easily fished. Scientific control of analysis and operations in the mill produces a steel that has a perfect combination of strength and ductility which keeps the flats out of the bends and eliminates pinched cables. Heavy galvanizing assures ample protection for the toughest temperature and moisture conditions.

Buy Buckeye Conduit for speed of installation and for permanent satisfaction to the owner. You make more money and you have the satisfaction of a job well done.

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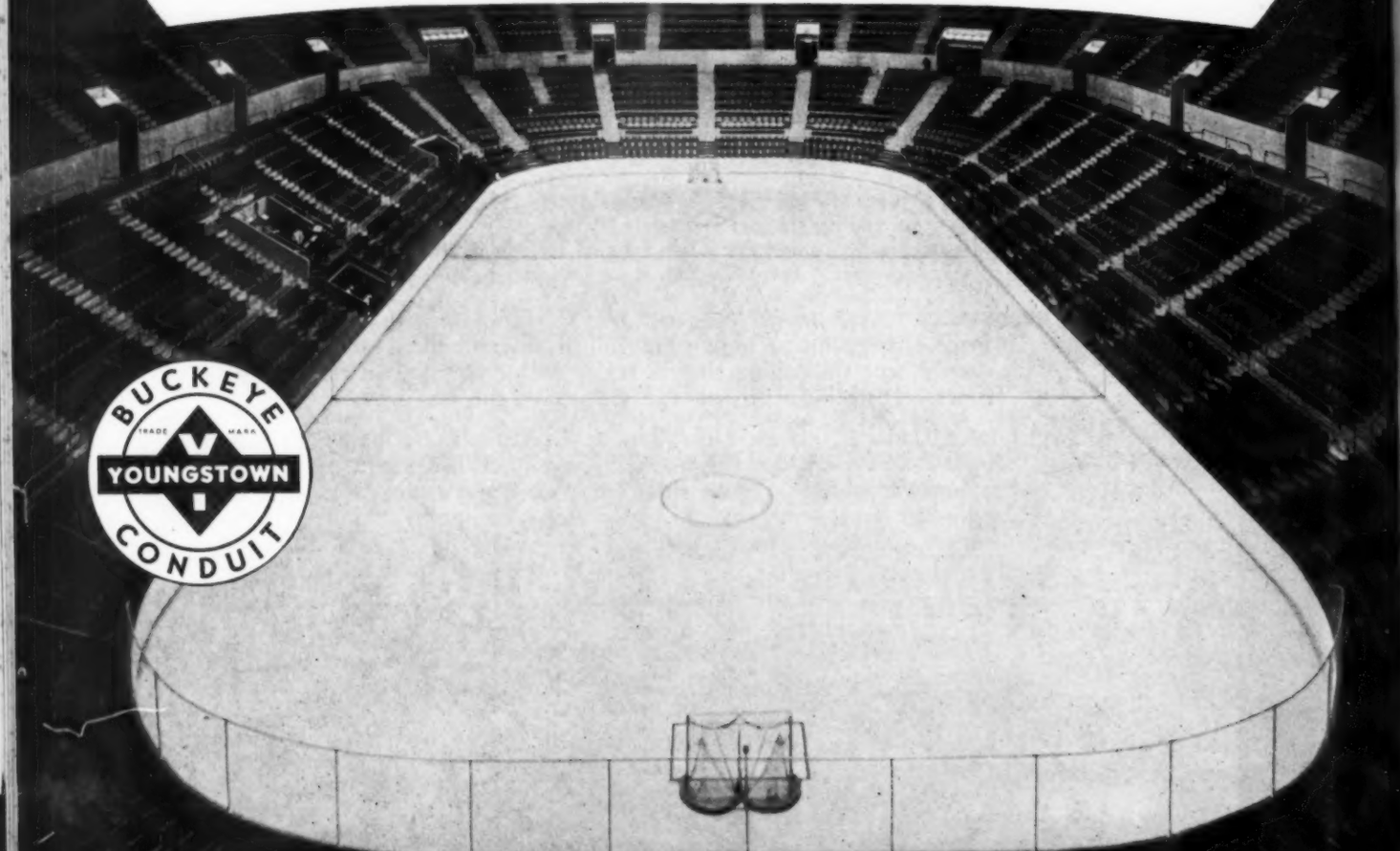
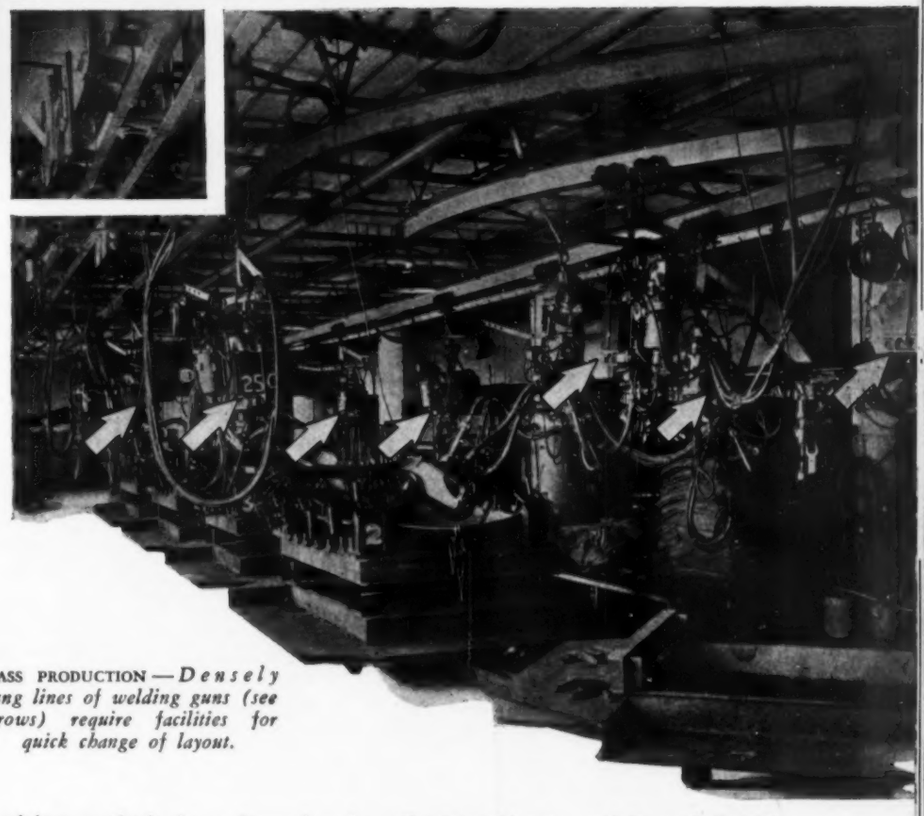


LOAD PROBLEM—*Auto plant feeders must supply hundreds of 50-kva welding guns along production lines.*

BUSSES *for* Welder Loads

By L. R. Bogardus
Chief Electrical Engineer
Packard Motor Car Company, Detroit, Mich.

This New Concentric Tubular Bus Construction Reduces Voltage Drop on Packard's Welding Feeders.



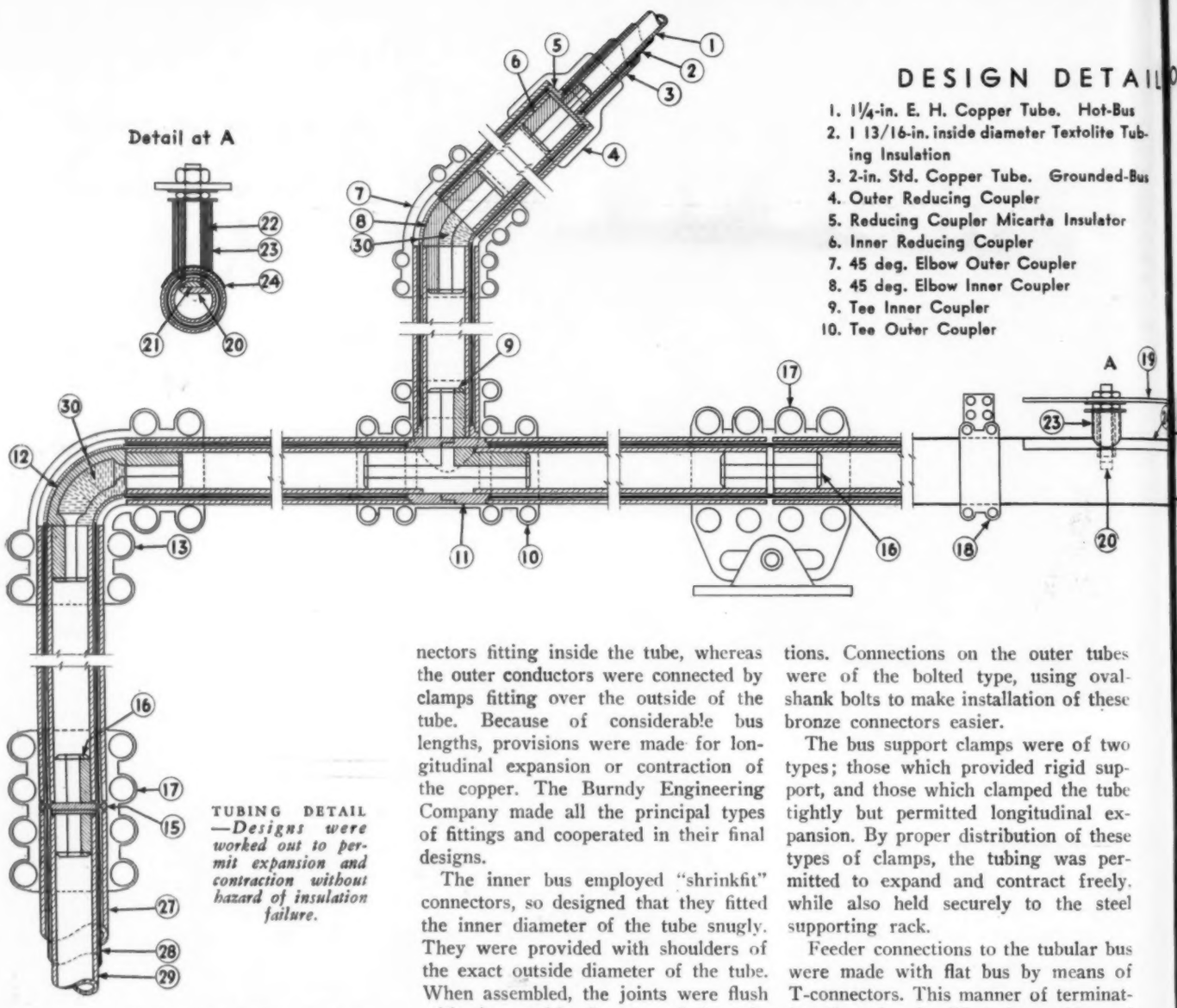
MASS PRODUCTION — *Densely hung lines of welding guns (see arrows) require facilities for quick change of layout.*

WELDING has become a major electrical load in the automobile plant. Because of the heavy low-power-factor current values involved, feeders must be able to meet unusual requirements. So after considerable investigation, the Packard plant was recently equipped with a system of concentric tubular bus feeders, which serves hundreds of 50-kva. resistance welders suspended along production lines. A connected load of about 18,000 kva. is now being handled under electrical conditions far superior to those experienced with the conventional system of feeder cables in conduit, or with copper bus bars.

Resistance welding load is very different from ordinary light and power. Its characteristics of low power factor, short-time high currents and the necessity of employing single phase circuits, requires a new arrangement of conductors. The use of conventional motor wiring methods have been found unsuited.

Regulation is a major problem in welder wiring, but conductor heating is not a serious factor in circuit design. Although current demands are extremely heavy, they are also extremely brief; therefore, the I^2R losses do not generate excessive heat. For example, gun welders impart their 50-kva. shots over a 3 to 6-cycle duration. But the heavy currents at low power factor produce high resistance and reactance drops. Therefore, circuits must be short between supply transformer and load, and conductors as close together as possible.

Feeder cables in conduit, as first used for welder wiring, soon exhibited disadvantages in making taps, when welder positions were changed or new ones added. Next, four or more cables were taped together to provide better interlinkage of fields and thus reduce reactance. This method is widely employed. A third way uses copper bars, usually four in a so-called "interlaced" bus, having adjacent bars on opposite circuit legs. By positioning two tubular busses, one inside the other, as worked out and employed in the Packard plant, reactance drop was reduced to slightly less than the resistance drop.


DESIGN DETAIL
1. 1¼-in. E. H. Copper Tube. Hot-Bus
2. 1 13/16-in. inside diameter Textolite Tubing Insulation
3. 2-in. Std. Copper Tube. Grounded-Bus
4. Outer Reducing Coupler
5. Reducing Coupler Micarta Insulator
6. Inner Reducing Coupler
7. 45 deg. Elbow Outer Coupler
8. 45 deg. Elbow Inner Coupler
9. Tee Inner Coupler
10. Tee Outer Coupler
Detail at A
A

TUBING DETAIL —*Designs were worked out to permit expansion and contraction without hazard of insulation failure.*

The tubular bus design employs an outer copper tube of standard four-inch iron-pipe size, which is the ground potential conductor. Inside this is a "textolite" tube for insulation. The inner tube is three-inch extra heavy copper, which provides approximately equal cross sectional areas of conductor. The conductor areas figure 3,835,000 circ. mil. for the inner tube and 4,040,000 circ. mil. for the outer. The outer tube is bare and is grounded throughout its whole length by its attachments to the supporting structure, thus greatly simplifying the problems of bus insulation and support. This side of the circuit is also firmly grounded at the supply transformers and welders. The assembled bus is provided with tapping points at six foot intervals for welder connections and employs ingenious methods of taking off bus branches, and for making reduced capacity extensions.

The problem of connecting and supporting the bus required the inner conductor to be joined by means of connectors fitting inside the tube, whereas the outer conductors were connected by clamps fitting over the outside of the tube. Because of considerable bus lengths, provisions were made for longitudinal expansion or contraction of the copper. The Burndy Engineering Company made all the principal types of fittings and cooperated in their final designs.

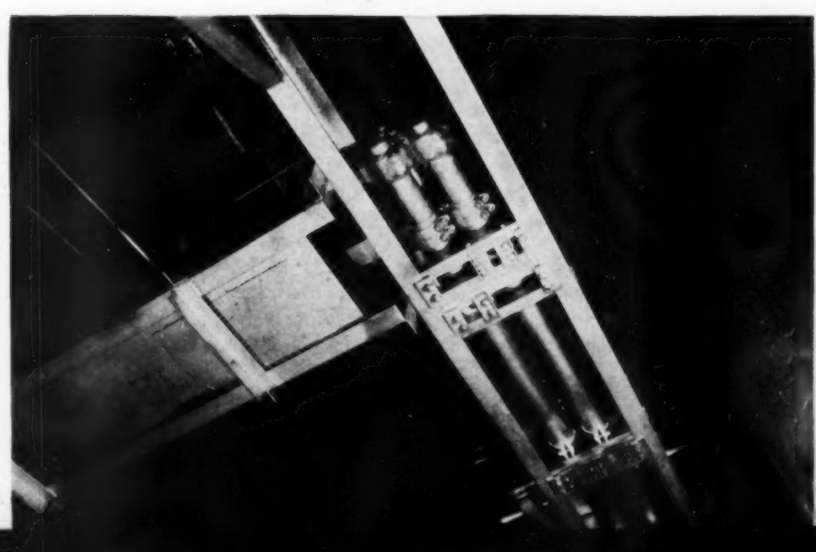
The inner bus employed "shrinkfit" connectors, so designed that they fitted the inner diameter of the tube snugly. They were provided with shoulders of the exact outside diameter of the tube. When assembled, the joints were flush with the outside diameter of the tube and presented a continuous unbroken surface for applying the insulating tube. The "shrinkfit" connectors were solder-tinned at the factory, and when installed, the joints were a combination of shrink-fitted and sweated connections. Connections on the outer tubes were of the bolted type, using oval-shank bolts to make installation of these bronze connectors easier.

The bus support clamps were of two types; those which provided rigid support, and those which clamped the tube tightly but permitted longitudinal expansion. By proper distribution of these types of clamps, the tubing was permitted to expand and contract freely, while also held securely to the steel supporting rack.

Feeder connections to the tubular bus were made with flat bus by means of T-connectors. This manner of terminating the tube simplified the problem of making connections to both inner and outer tubes. Connections to the inner tube were taped. The outer tube connections were left bare.

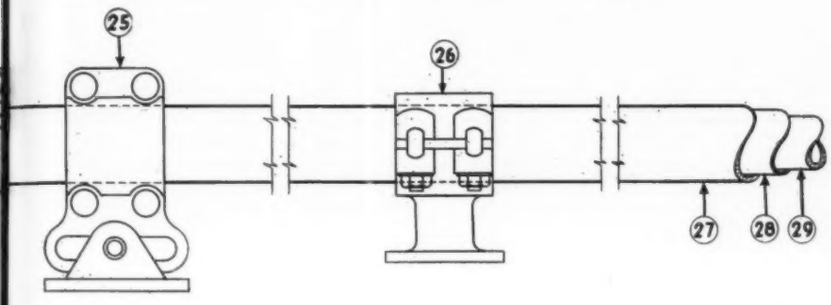
This bus system is used in two buildings, each served by a single phase

BARE COPPER—*Closely spaced and bolted directly to steel racks, three 480-volt single-phase tubular feeders here connect to flat copper welding transformer busses.*



R CONCENTRIC TUBULAR BUS

11. Tee Micarta Insulator
12. 90 deg. Elbow Inner Coupler
13. 90 deg. Elbow Outer Coupler
14. Outer Coupler
15. Micarta Disc for Inner Tube Support
16. Inner Coupler
17. Outer Slide Coupler
18. Outer Tube Polarity Connector
19. ¼ x 2-in. Copper Bus for Connection Take-off
20. Toggle—Inner Tube Polarity Connector
21. Copper Sleeve for Toggle Lock
22. Micarta Tube for Sleeve and Toggle Insulation
23. Micarta Tube for Shell Support
24. Micarta Shell
25. Outer Tube Slide Support
26. Outer Tube Rigid Support
27. 4-in. Std. Copper Tube. Grounded Bus
28. 3¾-in. I.D. Textolite Tubing Insulation
29. 3-in. E.H. Copper Tube. Hot Bus
30. Cambric Tape Insulation



bank of three 500-kva., 4800/480-volt transformers. The transformer secondaries in each bank are tied together and from each are taken three circuits running to the three floors of the buildings served. In one building, the tubular construction is continuous from the transformer bank, the three buses occupying corners of a square-section steel frame which runs horizontally from the transformers to the center of the building and rises to the three floors above.

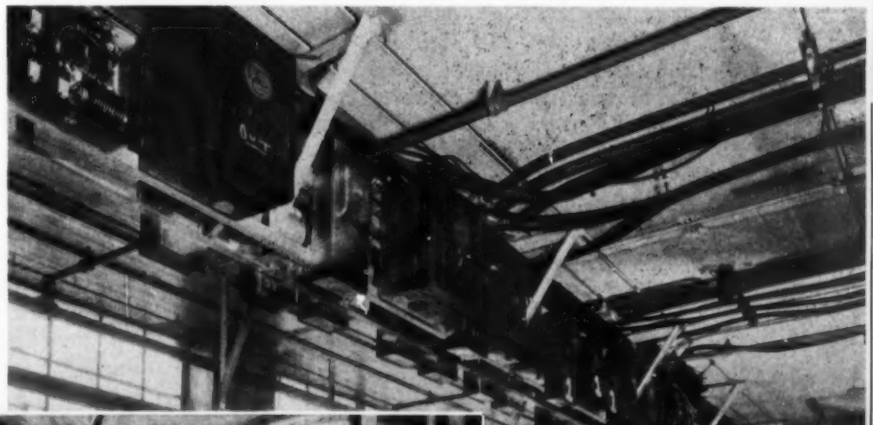
In the other building, the one first equipped, the tubular buses are used only on the working floors. Feeders to them are of interlaced bus dropping down from a roof-mounted transformer bank. All tubular bus circuits are of the "tree" type except one loop. The six circuits are of varying length, the longest about 500 feet. Tests show a voltage drop of about 0.13 percent per 100 feet of bus for a welding current of 1000 amperes at 480 volts and 40 percent power factor.

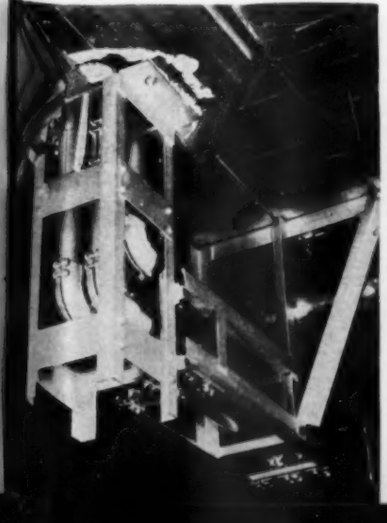
A sort of by-product advantage of the tubular bus is that the steel frame in which it is carried furnishes an excellent place for mounting the welder control equipment. All breakers, timers and contactors are thus attached to the bus structure, except in a few cases of pneumatic control. Here the timers and contactors are at the welders with only the breaker on the bus frame. Because 480-volt welding power is used, the bus racks include a system of 110-volt trolley bus from which taps may be taken to energize contactor coils and timers.

At this time our tubular bus system has connected to it about 500 welders of all types—spot, butt, seam and projection—including three large multiple hydromatics. They are being continually moved about, old ones replaced and new ones added. The total connected load on the six tubular bus circuits is of the order of 18,000 kva. This load, because of its extremely high diversity factor, is very easily handled by 3,000 kva. of transformer capacity. The connected load could probably be doubled or even more greatly increased without overloading the transformers. No appreciable heating of the bus has been observed, but if this ever becomes a problem, forced air cooling through the inside tube suggests an easy solution.

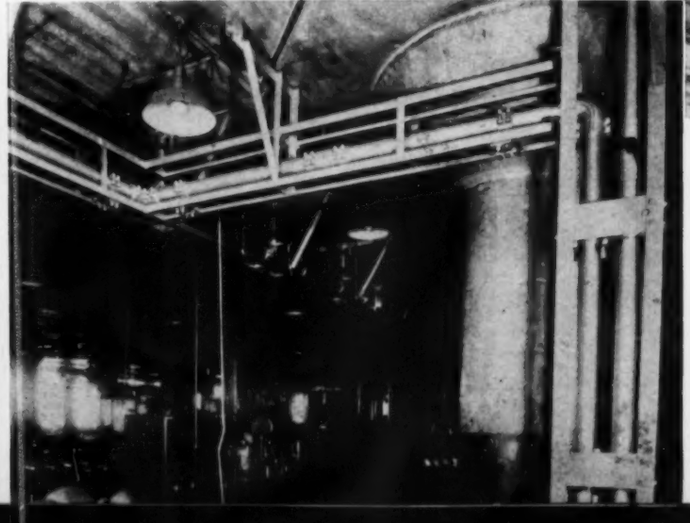
Two Detroit contractors, the Gray Electric Company and the Hydon-Brand Electric Company, shared in making this installation. Contracts were awarded after all construction details had been worked out in the Packard Plant Engineering Division.

DUAL FUNCTION—*Bus racks accommodate bare tubular conductors and densely placed contractors, timers and other control devices, without hazard.*





COMPACT FEEDERS—*A riser point where 90-degree fittings aid in routing three tubular copper feeders to welding floors.*



TREE SYSTEM—*Reaching its welder aisle, one feeder with T fittings extends both ways. Energy for 110-volt coils is taken from trolley bus run along the rack.*

CONTRACTORS IN DETROIT

Program Presents Rich Experience — Forum On Rural Electrification Goes to Bat With REA — Union Shop Section Launched — And Everybody Enjoyed Themselves

DETROIT'S NECA convention made several notable contributions. Though the registration was small—350 of whom 185 were contractors—the important men were there in numbers that make this gathering speak for the industry. It provided the occasion for a frank and open meeting between the qualified electrical contractors and the Rural Electrification Administration, in which long settling differences of opinion were laid bare to mutual advantage. In addition the new Union Shop Section got going, valuable experience was presented in the program, and some important resolutions were passed.

Among the delegates were 13 from the Pacific Coast, 34 from the Southeast and a good coverage of the country. There were present too secretary managers from the local contractors associations in Los Angeles, Seattle, Milwaukee, Chicago, Youngstown, Pittsburgh, Rochester, New York and Washington and, of course, C. C. Cadwallader of Detroit, secretary of the local convention committee. The ladies numbered 88. They found a bountiful hospitality awaiting them.

Monday—The convention sessions opened Monday, September 15, with a very gracious tribute to Ernest McCleary, past president and one of the founders of the National Electrical Contractors Association, now retired from business and an honorary member. Mr. McCleary stood before the younger men of the industry honored by all, a symbol of the Association's fine traditions. Introduced by President Earl Peak, he told of the first gathering of the industry at Buffalo in 1901 and described conditions in the business in the nineties. He presented to the Association the gavel which he had used as president in the early days.

Earl Peak's annual address reviewed the year's progress in adjusting voluntary Code bidding procedure to recent state and Federal legislation. He outlined the active work of NECA in its defense of contractor interests nationally. He made a strong plea for active local interest in articulate NECA units to deal with the pressing problems of licensing, inspection and industry relations.

The report of Laurence W. Davis, general manager, came next and presented the vital problems of finance involved in active association operations. Ralph M. Walker, continuing his strong plea for "Fair Buying and Selling", brought to Detroit new reasons for improved methods of distribution in the recognized trade channels. D. B. Clayton's paper on Voluntary Agreements told the story of Southeastern progress and wound up the Monday morning session.

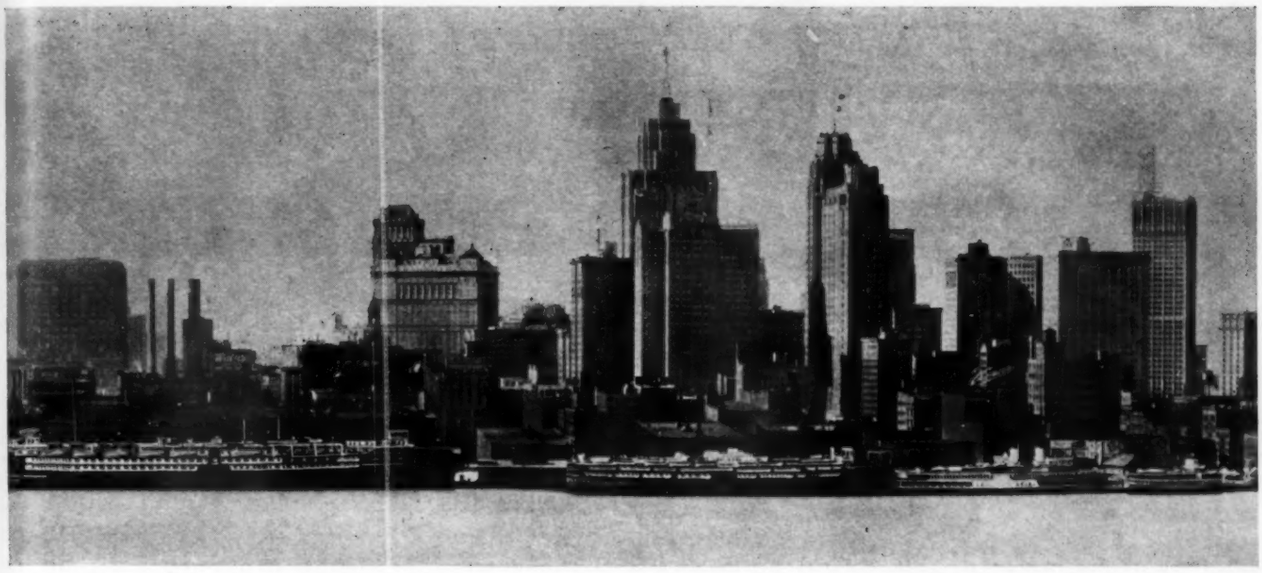
To show that fair practices in bidding may be maintained harmoniously in a given community, W. T. McAuley outlined the important factors which have guided Kansas City's successful experience in this connection. This paper opened the afternoon session, after which it was strictly an REA party until the late end of a night session. Papers were presented in the afternoon by Ward Freeman, Chief Engineer of the Rural Electrification Administration, appearing for Adminis-

PAST PRESIDENT *Ernest McCleary, Detroit (right) presents his gavel to President Earl Peak for use hereafter.*

CHICAGO CHAPTER *President Wm. McGuineas in a hob-nob with Executive Committeeman E. C. Carlson of Youngstown.*

CANADIAN COMMITTEEMEN *George Patterson from Toronto and John Schumacker from Winnipeg.*

SHELLING OUT—*Charles Su... Milwaukee and Walter C... of Chicago step up to the ...tration desk.*



trator John Carmody, who was detained in Washington. J. Werner Pyles, head of the REA Wiring Section, and Henry D. Brite, Commercial Manager of EHFA completed the trio.

These men discussed rural electrification, its progress to date, improvements in pole line construction and farmstead wiring, and the facilities for financing wiring. A rousing Monday night session permitted the REA engineer staff and the contractors to let down their hair and comb out past mistakes and how to correct them in future pole line and farm wiring projects. It was a spirited session.

Tuesday—This morning came James H. Turvey, president of the Ontario Electrical Contractors Association with a greeting from our Canadian cousins. He paid tribute for NECA's help in Canadian contracting affairs. Two timely papers on vital phases of industrial contracting work were then given by Frank M. Hydon and W. A. Millen. Mr. Hydon's final plea "Let's not make industrial work cheap work", paved the way for Mr. Millen to explain how to obtain and to charge for factory jobs on a cost-plus basis.

Then P. M. Geary, secretary of the Youngstown NECA Chapter, presented a novel mass production plan for handling range and hot water heater installations. Mr. Geary manages a closed corporation, owned by local contractors, that has taken over all this work. William F. Patterson, executive secretary of the Federal Committee on Apprentice Training, Washington, wound up the day discussing the need for training future journeymen.

A night conference of the union shop members, exclusively employing IBEW labor, followed. This conference was heavily attended, conducted by E. C. Carlson, chairman of this section of NECA.

The outcome of this evening session, and much sectional caucus discussion, was to attract heavy attendance to the closed session which followed on Wednesday afternoon. These deliberations developed promise of further progress toward improved employer-employee relations. Other officers chosen for the Union Shop Section were Clyde L. Chamblin of San Francisco as vice-chairman and A. Lincoln Bush of New York as secretary.

Wednesday morning's sessions provided more red meat for contractors—a rapid succession of 15-minute presentations covering the latest business building ideas as seen by engineers and specialists of various electrical manufacturers. There were six papers in all, devoted to non-metallic conduit, power factor, explosion hazards, line losses, silent switching and new illuminants. This business building symposium was heavily attended and brought out many constructive queries from the delegates. It proved a popular new convention feature. The afternoon was given over to a further conference of the union shop delegates. The rest played golf.

Wednesday night came the banquet —and what a party! A crowd of nearly 500 attended. Fine talent put on a floor show, and a splendid dance orchestra played state songs for cheering native sons.

LOGAN *Court House, where Lincoln practiced law, attracts NECA visitors. This is in Greenfield Village.*

COMEDY STARTS—*When Convention Secretary C. C. Cadwallader gangs up with Entertainment Chairman Surrell.*

ROMANCE OF LIGHT—*S. G. Hibben of Westinghouse presents new horizon in the lighting field.*

IT'S OVER—*The survivors are Jack Weatherby, left, New York; J. W. Eilbrecht, Jack Zielstra and Earl Surrell, of Detroit.*

Fair Buying and Selling

By RALPH M. WALKER, Atlanta
Chairman, NECA Fair Trading Policy Com.

NECA has a goal—to make the contractor the salesman of electrical construction materials to the final user. The fact that orderly distribution from manufacturer to wholesaler to contractor to user has broken down, has been costly to all.

To restore order the contractor must learn loyalty to individual brands, buying through wholesalers at regular prices and ignore the siren song of chiselers. Also, evidence is now before the Federal Trade Commission showing violation of the Robinson-Patman Act by every manufacturer of conduit, wire and cable, by more than 100 contractors in 28 states. This should discourage the granting of wholesale prices to those not entitled to them.

The contractor is the key man in this situation. If he will put his business on a decent pricing basis and be fair with his competitors, a great opportunity is within his grasp. In 45 states Fair Trade Laws make it possible for him to discipline unfair manufacturers and wholesalers.

Fair Competition in the Southeast

By D. B. CLAYTON, Birmingham
President, NECA Southeastern Industrial Chapter

EIGHTEEN contractors meet four or five times a year at some resort hotel in the Southeast and operate a "Voluntary Agreement of Fair Competition." It sprung from their common desire to better their individual conditions. They discussed it, became better acquainted, developed a set of rules for business conduct, operate according to sound economic principles, embracing a fair profit, proper service to the customer.

This agreement sets up self-imposed penalties for violations of the rules. Each member puts up a bond. Rules change by unanimous consent. Each member prepares estimates and bids as he wants to, but penalizes himself if he does not submit them on a legitimate basis with due regard to cost and accuracy. Then the whole group analyzes the bid at its next meeting and gains by the experience.

There is no attempt at coercion or monopoly. But every member profits by avoiding losses and the plan works.

DOORWAY HUDDLE, *by C. L. Chamblin, San Francisco, Larry Davis and E. L. McCleary, Detroit, doing assorted smiles.*

FROM PACIFIC SHORES *came (left to right) Clyde Chamblin, F. M. Vanderlip, A. L. Stone, C. T. Smallcomb, H. L. Evans and J. J. Newitt.*

Thursday—The morning session opened with a one-hour general open forum. George Andrae, one of NECA's two representatives on the Electrical Committee, NFPA, addressed the convention regarding the recent proposals of the Edison Electric Institute for revisions in the next Code. Mr. Andrae recommended that no action be taken in resolution form during the convention. But he asked that all those present urge their local groups to become thoroughly familiar with these proposals. Then, said Mr. Andrae, all members should transmit to their Code-making representatives constructive opinions and recommendations for possible consideration before the next NECA convention.

Important phases of rural wiring were also discussed during the forum period, resulting in the appointment of a committee to work for a further improvement in governmental procedure affecting both line construction and wiring of farmsteads. President Peak selected a committee of seven contractors, comprising President Peak as chairman, Ned P. Hoisington, Philadelphia; R. C. Bigby, Tampa; M. E. Hart, New Orleans; Paul L. Gilmore, Columbus; H. M. Schulman, Chicago; and F. E. Surrell, Detroit.

Next William G. Hazel discussed the fundamental principles of pricing time and material jobs, then L. P. Dendel explained the operations of Michigan's electrical inspection law. This paper developed so much constructive discussion that it was necessary to call a special afternoon meeting for interested delegates, which followed the official adjournment of the convention. To wind up the formal program C. M. Ripley of General Electric dramatized the possibilities ahead for the electrical industry. His many comparisons of how much less it costs to live better in the electrical way he summed up—"One 'believe-it-or-not' multiplied by another 'believe-it-or-not' makes a miracle". It brought to an enthusiastic audience a new concept of its waiting market in the homes of America.

Action—Announcement of the election of executive committeemen followed. For Division No. 2 they reelected A. Lincoln Bush of New York, Division No. 5 again chose D. B. Clayton of Birmingham. Division No. 8 elected M. E. Hart of New Orleans, succeeding H. A. Hood of Houston. Because no one from Division No. 1 attended the convention, the New England area continues without a representative on the executive committee as in the past year. No other offices were expiring this year.

The resolution committee headed by D. B. Clayton, presented the following motions which were adopted—

1. A resolution to REA voicing

WOLVERINES, *President Wallie G. Campbell (left) and Secretary H. B. Gelders of the Wolverine State Association.*

ENTERTAINMENT COMMITTEE *conference, Chairman F. E. Surrell with hostesses Mrs. J. H. Busby and Mrs. M. L. Ansel, planning some more fun.*

NATI DELEGATES *John O'Connell, Ed Thos. Herschede and G. F. Bertke crescent with a heavy end that does the talking.*

COAST TO COAST—*H. L. Evans and J. J. Newitt of Los Angeles caught after a greeting from R. M. Walker of Atlanta.*

NECA's opposition to any action that might be taken toward setting up a purchasing authority as a part of REA, for the purpose of purchasing equipment or materials to be used in rural electrification projects.

2. A resolution expressing disapproval of prevailing practice by suppliers in quoting complete project assemblies for pole line construction.

3. Another resolution protesting the unfair practice of other industry groups in preparing estimates for competitive bidders who very often are not qualified to perform such functions themselves.

4. A resolution paying tribute to the memory of Robley S. Stearns, New Orleans, an honorary member and past president of the association.

5. A resolution establishing the dues of members at $100 a year, with discounts for volume classes under $200,000 a year.

In closing the convention, Earl Peak announced Philadelphia as the 1939 meeting place and predicted a bright year ahead. He urged all to come to the Quaker City and ring the old Liberty Bell. The show was over. NECA had seen Detroit at its best—a city filled with industrial romance. Delegates left reluctantly, wishing they might have remained much longer to see more and to enjoy its overflowing hospitality.

THE MANUFACTURERS SHOW

Wiring materials, electrical apparatus, tools and lighting equipment filled the convention exhibit hall and flanked the main corridor. Manufacturers and dealers displayed their products for NECA members and visitors, and it was a good show.

Attractive settings and elaborate background set off ingenious displays of wiring devices, panelboards, conduit, wire, fittings, motors, controls, circuit breakers, lighting fixtures, safety switches and specialized equipment. Several manufacturers demonstrated new developments in cutting and drilling tools. A complete automatic telephone system occupied a prominent booth. In one section the factory method of calibrating automatic circuit breakers was in operation. Nearby a splashproof motor ran serenely under a steady stream of water. Crowds gathered to watch a portable ceramic drill cut its way through glass.

Several new products made their bows—a fluorescent tube fixture for high intensity light of daylight quality, fixtures designed for use with 1000 watt bi-post lamps, masonry drills of superior hardness, trolley bus systems, welded square tubular busbar, bus duct systems. Many other innovations were of direct interest to the electrical contractor.

GENERATIONS—*Fred Adam and son, , of Frank Adam Electric; Henry of Detroit Edison, with his father , retired chief inspector of Detroit.*

NORTHWESTERNERS—*H. A. Smith, Spokane; R. D. Horning, B. A. Travis and Sam G. Hepler, Seattle register present, and a genial good humor.*

Bidding Practice in Kansas City

By W. T. McAULEY
President, Kansas City Chapter, NECA

KANSAS CITY adopted a Voluntary Agreement of Fair Competition on June 1, 1937. The group also adopted the Henderson-Hazel pricing system for materials and a fixed selling price for labor, under the NECA Manual of Labor Units. They estimate all work on a selling price basis. Local wholesalers cooperated by establishing proper differentials for the contractor on supplies and lighting fixtures, commercial and industrial. Specialty fixture houses tied in.

An industry committee was then formed with the support of the power company. It organized a residential outlet campaign with surveys and time payments, an advertising campaign on industrial modernization and an industrial wiring survey. The latter won the strong support of the inspectors. They found that qualified electrical contractors were receiving only 25 percent of the power companies business and developed a cooperation that now is bringing 75 percent to the qualified group.

Industrial Cost Plus Jobs

By W. A. MILLEN, Windsor, Ontario
President, Millen Electric Co.

ABOUT 1928 many manufacturers began to publish net prices. From that time on we have done half of our industrial business on a cost-plus basis. Jobs from $100 to $2000 we figure at cost plus 20 and 10. The advantages of the system are—

1. Customer may check grade and cost of materials. He knows prices are uniform and contractor is making a fair profit and is really working for him.

2. Contractor saves time estimating, has no argument over cost of materials, can sell better grade of materials and equipment best suited for the job.

3. Customer places all responsibility on one contractor and wants the same workman to reduce supervision.

4. Contractor is usually assured of all the customers work and obtains a steady revenue.

5. Contractor need not make up on one job his losses on another, need not skimp jobs or worry about unfair competition.

NECA and REA Get Down to Cases

Federal Men Present Their Record and Recommendations—Contractors Close in With Criticism and Constructive Suggestions—A Merry Time is Had By All

FINANCING PROGRESSES—*EHFA plan for financing wiring was presented by Henry D. Brite of Washington.*

THE livest topic before the Detroit convention was rural electrification. John M. Carmody, Administrator of the Rural Electrification Administration was supposed to be there, but did not appear—which was a disappointment. The contractors wanted to talk with the head man.

But four good men came and told the REA story. And there was an open forum in which everybody took down his hair and told what he thought. It was not a pleasant evening for the REA men, but it undoubtedly has done some good. There is a closer understanding on both sides.

Record of REA

Monday afternoon was devoted to the case for REA—and first came a paper by Carmody, presented for him by Ward Freeman, Chief Engineer of REA.

Over 90 per cent of all the funds loaned so far by the Rural Electrification Administration he said has been paid to contractors. Participating in the handling of these funds are over 160 contractors, awarded contracts for the construction of rural electric lines. More than 50 contractors have been awarded work on generating plants. Over 750 contractors have been awarded wiring jobs. The record so far is as follows—

Up to now allotments made by REA have totaled approximately $123,000,000. Slightly in excess of $118,000,000 went for line construction and operation—to provide in the neighborhood of 120,000 miles of rural electric line. Approximately $3,000,000 was for small generating plants and $750,000 was for wiring. In the first two years 61,000 miles of rural line were completed and by the end of next June 70,000 miles additional will be constructed. Over 260 projects are now energized.

Over 105,000 rural families are today receiving electric service from rural lines financed by REA. With this year's funds they expect to provide electric service for more than 400,000 additional families. Meanwhile, all this has stimulated action by the private utilities and they have added over 500,000 farmers to their line in the past four years.

Additional benefits are derived from the wiring of the hundreds of thousands of farms securing electricity for the first time. Figures indicate that over 600,000 farms in the United States have been electrified since the REA program started in May of 1935 and nearly every one of these farms had to have new wiring installed. Over $50,000,000 has gone into the wiring of these farms!

While both of the great mail order houses report an increase in the sales of wiring supplies in rural areas, it is estimated that approximately 75 per cent of all wiring done along lines financed by REA has been performed by local contractors.

To insure the safety and satisfaction which good wiring provide, REA has conducted schools for wiring inspectors, and has established wiring inspection in many rural areas where it has previously been unknown. Since only material as approved by underwriters must be used, REA has improved standards of rural wiring by approximately 50 per cent.

REA claims of success in reducing rates show that in 1937 the average farm customer used 1014 kilowatt hours, for which he paid $47.86, as against only 811 kilowatt hours for $49.63 in 1936.

Farmstead Wiring—J. Werner Pyles, head of the Wiring Section of REA, made a frank appeal for cooperation toward setting up mass production methods for farmstead wiring. Contractors in general were charged with viewing this huge market with closed minds, an unwillingness to modify one-job methods and attitudes. He states that in one area only nine contractors out of 125 were interested in the REA wiring program.

Mr. Pyles summarized the REA wiring program this way—

1. REA will help organize meetings of contractors to set up orderly procedure.
2. Objectives will be quick completion of entire projects, uniformity of prices in line with local conditions, familiarity with wiring requirements, adequacy of wiring systems provided for the farmer, and the use of modern lighting equipment and materials of good quality.
3. Mutually agreeable schedules of unit prices are needed for all kinds of outlets and the avoidance of obviously low bids or unreasonably high bids.
4. Organized localities will be encouraged to handle groups of 100 houses or more in one operation.
5. Farmers will not be able to waste the time of numerous bidders because predetermined price schedules will apply throughout the project area.
6. Solicitation costs will be eliminated from the contractors' selling expense. Jobs will be delivered to them, ready to go.
7. The new group program will speed up project operations from 50 to 75 per cent. Farmers must now be signed up ahead, whereas on the old basis, months were wasted over contracts.
8. Contractors are protected against "come back" orders. Farms not wired in their order along the line will be required to pay higher prices.

Because contractors too often have only antiquated lighting fixtures on display, or do not show a full line, five manufacturers have announced "unit lighting packages" for farm homes. They contain nine complete fixtures available in three grades to be sold by the contractor for about $20, $30 and $40.

Mr. Pyles predicted farmers will deal with the electrical contractor if this market is approached on a production

MASS PRODUCTION—*Contractors can profit from farm wiring by group operations, says J. Werner Pyles, of REA.*

REA ENGINEER—*Ward Freeman, Chief Engineer of REA, speaks as pinch-hitter for Administrator Carmody.*

basis. Many sales at a lower profit per order will make the REA farm wiring program profitable to contractors.

Financing Farm Jobs—Henry D. Brite, Commercial Manager, Electric Home and Farm Authority cleared up the financing phase of the rural wiring situation. These points stand out—

Five years ago the Federal Government set up the EHFA to finance the sale of electrical appliances and to promote their wider use. Many complaints received from people whose appliances did not operate properly proved that their wiring was inadequate—wires too small—voltage down.

So EHFA has developed a finance plan for house wiring. Under this plan the customer pays 10 per cent down and a financing charge of 5 per cent per year. He may have 24 months, paying the installments to his utility with his light bill. Lighting fixtures may be included. The contractor guarantees his work for a year, endorses the customer's note without recourse, and, after inspection, receives the 90 per cent balance of his money from EHFA.

This finance plan is making it possible for people who could not pay cash to purchase adequate wiring installations. It is creating many wiring jobs for contractors that would not otherwise be obtained.

The Showdown

In the evening about 100 contractors, gathered for a showdown. There were men from the middle west, the Pacific Coast and the deep south. They listened first to a talk by D. P. Babcock of the REA engineering staff, analyzing causes of delay in past line construction, explaining how these troubles are to be eliminated in the future. Then questions started flying—and complaints.

Out of the room-full, about a dozen contractors who have been active in REA work, did most of the asking and the telling, but the rest of the room was behind them. And the REA men took it and did what they could. Complaints on pole line construction were these—

Trouble with Pole Line Projects—1. *General Dilemma* — Contractors claim they have no recourse from dictatorial tactics of field or project engineers. They must "take the rap and like it."

2. *Projects Bungled*—Inefficient staking and easement procedure is claimed on line-building projects. Some improvement seen of late, however.

3. *Improper Supervision*—REA engineers say contractors start jobs too soon. Should not begin until small projects are completely staked and on larger ones, until at least 75 miles are staked.

4. *Strafing Methods*—REA asks contractors for weekly report of progress or troubles on project, to center the blame. Contractors claim they can't risk sending such reports. Project engineers would ruin them or interfere with them getting other jobs.

5. *Personnel Lacking*—Contractors criticized incompetency of field staffs. One contractor cited $12-per-week REA instrument man, sent to a project, who laid out 1½ miles of line per day, although sufficient crew was on the job to build five to six miles per day.

6. *Holding Sack*—Inaccurate REA material estimates were claimed to prevent contractors from placing complete orders in advance. Only safe to order after staking is complete, although REA wants project speeded. But contractor must assume all risk of left-over materials regardless of what the project estimate calls for—say contractors.

7. *Better Planning*—REA claims 2-inch scale project maps are now standard, show country roads, rivers. This is promised to provide greater accuracy for contractors in future projects.

8. *Slight Error*—Poor engineering is a general claim. One sub-station location was off five miles between the map and final staking, a contractor reported.

9. *Expensive Comebacks*—REA inspectors come on jobs sometimes a year later and write up reports of leaning poles or other damages from the elements. This results in expensive comebacks. Sometimes a new man follows with a second report demanding other comeback work from the contractor.

10. *Regimenting Suppliers?*—Why does REA need to set up a Purchasing Authority as is rumored? What is it for, and how will it affect contractors in supplying materials? The several answers given to these contractor queries failed to satisfy the majority. A resolution voicing NECA disapproval regarding this matter was adopted before the convention adjourned.

Farm Wiring Headaches—And there were just as many protests and inquiries on REA farm wiring conditions. They can be listed this way—

1. *Prohibitive Costs*—Contractors are licked before they start, if they expect to wire farms at big-city labor costs, said J. Werner Pyles of REA. The $1.65 per-ceiling-outlet price schedule in Iowa was based on 70 cent labor, averaging ½ hr. per opening.

2. *No Compulsion*—REA not dictating to contractors, not driving for cheap prices. Labor already investigating to see how lowered-scale plan might fit in for contractors. Some contractors have agreed to local price schedules.

3. *Data Needed* — Little estimating knowledge available for farm wiring. Most contractors make unreasonably high estimates. One-job viewpoint held unfair and detrimental by REA. Contractors need education on methods for doing low-cost farm wiring.

4. *Public Safeguards*—Inspectors assigned in 45 previously "open" states, under REA program and within one year now number 400. Already about 25 replaced where found inefficient or dishonest.

5. *Promoting Contractors*—REA does not educate farmers in wiring, but warns

(Continued on Page 88)

JOB PUSHER—*Engineering analyses are finding the bugs in rural line project delays. Colonel Dudley P. Babcock, REA engineer, tells how with interesting job charts.*

Youngstown Makes Range Wiring Pay

Twelve Contractors Set up a Separate Company and Took All the Range Wiring — at 20 Percent Under Old Costs — And Mass Production Made It Pay

P. M. GEARY *manages mass production range wiring operations for local contractors.*

By P. M. Geary
Youngstown Manager
Steel City Installation Company

Mr. Geary, in this paper just presented before the NECA Convention in Detroit, has made a splendid contribution. Range wiring offers a rich opportunity to the electrical contractor. But it has been largely lost to the qualified contractor because he has offered prices so far above those of free lance journeymen. Youngstown has faced this situation and found the answer. Geary tells how.

Out of this experience, Mr. Geary has come to some conclusions. He frankly told the convention what he sees wrong with the contracting business. This second half of his paper will be published here next month.

OUR Company makes all of the range water heater installations in Youngstown and vicinity. The number of ranges sold there is high compared to the total domestic meters because the local utility company maintains a low domestic rate. For many range users it is as low as 1½ cents per kwh. Also this company aggressively sells ranges itself and encourages the dealers throughout the territory to sell.

Besides the very low rate for current, two things help sales. The utility company bears a large part of the cost of the installation, regardless of whether the sale is made by its own appliance store or by a dealer. It makes its financing plan available to any dealer who cares to use it. During a normal year approximately 1,200 ranges and 500 water heaters are sold in Youngstown and vicinity. Since the utility company bears most of the cost, all installation orders are received by it, either from its own merchandising department or from the dealer making the sale. These are turned over to our company 48 hours in advance of the time to make the installation.

Prior to September 1937, orders for range and water heater installations were divided on an equal basis among the members of our NECA chapter, at a price which was agreed upon as a fair price from time to time, between the chapter and the company. Since any one contractor received only a few jobs at a time, under this plan, it was not feasible for any of them to make any special arrangement for handling these small jobs. And with a wage scale of a dollar and a half per hour, the cost and, therefore, the selling price did not compare favorably with the price at which this work was being done by journeyman contractors in other communities throughout the county. As time went on this unfavorable comparison grew worse.

It was finally proposed that as many of the members of our chapter as cared to do so should incorporate a company for the purpose of contracting with the utility company for all of the range and water heater installations in the territory. It was believed that standardization of materials and specialized production methods would permit of savings. A company was formed with 12 of the 16 members of our chapter as stockholders. A contract was made for one year for complete installations and for partial installations, at figures about 20 per cent less than any which had existed heretofore. A capital investment of approximately $6000 was required to finance the new company. This included the cost of making the necessary alterations to an old building, to make it suitable for use as an office, shop, warehouse and garage.

After nearly a year of operation our operating statement shows the following ratios;

Material Cost	29% of Sales
Labor Cost	27% of Sales
Direct Job Expense (Incl. Truck Costs)	15% of Sales
Total Prime Cost	71% of Sales
Margin	29% of Sales
Total	100%

Interpreted in terms of journeyman labor hours employed, these figures are:

Material cost per journeyman hour	$1.61
Labor cost per journeyman hour	1.50
D.J.E. cost per journeyman hour	.82
	3.93
Margin per journeyman hour	1.55
Sales Billed	5.48

Since both journeymen and helpers are employed on this work, we obtain the number of journeyman hours per job

by dividing the labor cost by the journeyman's rate, which in Youngstown is $1.50 per hour.

Our company's prime cost for a complete range installation is approximately 30 per cent less than average prime costs of the various contractors who were doing this work prior to September 1937. The savings effected have been about equal in both material and labor, while the records show that our company has had a small increase in direct job expense. This increase is explained by the fact that our truck cost is allocated to each job as a direct job expense instead of being absorbed in general overhead as was being done by the other contractors.

The saving made in material cost is due to quantity purchases, and to the fact that material prices in general have been lower during 1938 than they were during 1937. The average labor per complete range installation has been reduced from eight to five and a half journeyman hours. Several factors are responsible for this:

1. Standardization of materials and methods.
2. The same men are employed as far as is possible. When the same mechanic works on the same kind of work day after day, handling the same materials and following the same general installation method, he becomes an expert and finds for himself many short cuts and time savers that his employer would never think about.
3. A journeyman and an apprentice work together. The journeyman conserves his energy for work requiring more skill. Of course, since the apprentice receives a much lower wage rate, the hourly cost per crew is reduced.
4. Transportation equipment. The territory served has a radius of approximately 15 miles, while our average truck mileage is nine miles per job. Each crew is provided with a ½ ton truck, equipped with a steel body especially designed for the purpose. It is not necessary for a crew to come back to the shop for anything. This method reduces traveling time to a minimum, and being well and properly equipped gives the mechanics an incentive to do the best they can.

The specifications in Youngstown and vicinity at present, for a complete range installation in a single family dwelling, are as follows:

1. Run 2 No. 6 R. C. and one No. 6 bare conductors in 1" electrical metallic tubing from service entrance fitting, not less than 15' above the ground level at street side of building nearest company's nearest pole, through outside meter socket to 60 amp three pole S/N Safety switch and distribution cabinet, with 60 amp range circuit and four 15 amp circuits.
2. Ground neutral and equipment to water pipe or driven ground with No. 4 bare copper conductor carried exposed.
3. Put No. 4 copper jumper around water meter.
4. Connect old lighting and appliance circuits to new distribution center.
5. Run range circuit from distribution cabinet to location of range plug receptable in 3 No. 6 bare neutral unarmored cable.
6. Material furnished by the utility company; one piece main switch and distribution cabinet, range plug receptacle, and the meter socket.
7. All ranges are delivered by the utility or the dealer making the sale, with cord and plug attached.
8. All services are located at the front corner of the house which of course involves longer range runs.

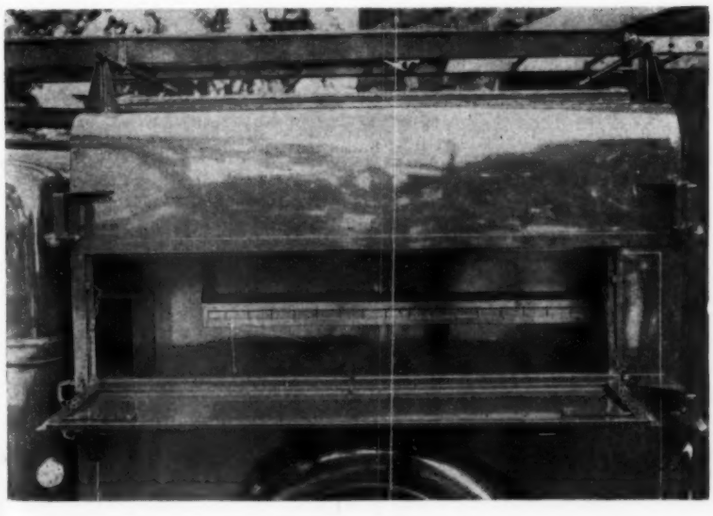
Direct job supervision is unnecessary. Each journeyman is entirely capable of laying out his own work, and an intelligent clerk can route the orders and assign a days work to each crew. Stock room, delivery and transportation expense are combined and cost little more than transportation alone, because each truck is a traveling stock room. Since all orders are received from the utility company and all work done is paid for by it, there is no sales expense and no collection expense.

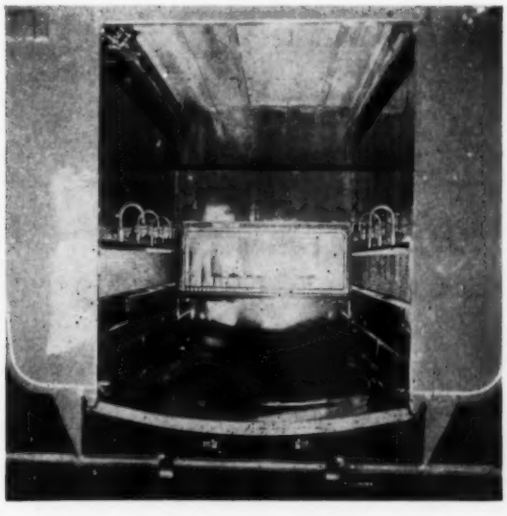
Our experience proves that, where a sufficient number of range and water heater wiring jobs can be concentrated in the hands of one concern, it is possible by specialized and standardized methods to reduce the prime cost by approximately 30 per cent. This is due largely to reduced overhead.

MODERN METHODS *include good rolling stock. Here are three specially equipped trucks that supply range wiring crews.*

NO LETTERING—*To avoid competition with the other normal business of local contractors the hinge-out sides of trucks bear no advertising.*

MOBILE STOCKROOMS *save time for skilled men and avoid trips back for trivial items needed in the day's work.*





Picking Service Customers

GEORGE F. SCHUCK, *Contractor-Dealer of Germantown, solved the problem of keeping his company's name before its customers and the general public.*

ADEQUACY INSURANCE — *Novel policy form with ten numbered coupons which Schuck sent to 3000 ledger accounts and 2000 selected prospects. Read about the results.*

IT'S A GOOD
Policy
to have your electrical system inspected once a year by a competent electrician. . . .
Expires MAY 31, 1939
No. 15672
Issued to
MR. PROPERTY OWNER
Participating
Any property owner who takes advantage of the benefits outlined in this Policy can participate fully in the savings effected by a safe and efficient electrical system.
Electric Wiring System
SCHUCK ELECTRIC CO.
Motors and Control Apparatus
SCHUCK ELECTRIC CO.
Electrical Appliances
SCHUCK ELECTRIC CO.
Lighting Fixtures
SCHUCK ELECTRIC CO.

Novel Inspection Policy Brings Action from this Contractor's Community

GEORGE F. SCHUCK who operates the Schuck Electric Company in the Germantown section of Philadelphia has found a way to draw customers to a contractor's shop. He has a plan. He makes it also produce wiring business. It keeps fourteen people on the job rendering all sorts of electrical service. And this is not too easy, for Germantown is a conservative old historic town.

Schuck recently sent out to 5000 homes a novel invitation, which looks like a folded insurance policy. It has an engraved gold border, bears a policy number and an expiration date. Inside are ten detachable coupons, of which five are good for special bargains on electrical merchandise, and five are good for free inspections of radio, wiring, motors and controls, appliances and lighting fixtures. The "policy" carries some good copy about electrical safety, good workmanship and what the Schuck Company is equipped to do for people.

As this campaign cost Mr. Schuck about $225 for printing and first-class postage, the mailings were made to 3000 of the Schuck Company's ledger accounts. An additional 2000 names were selected from high grade prospect lists.

The response to this campaign is analyzed in an accompanying summary. It shows what electrical problems are of chief concern to home owners. It also indicates that many jobs of re-wiring, re-fixturing and general repairs are simply waiting to be sold. The Schuck Company dug them out and got action. Some were small fix-up jobs, but many involved worthwhile wiring and refixturing orders.

Handling the Inquiries

As free inspection coupons were received, they were routed for quick handling. Wiring recommendations were made orally and approximate prices quoted on jobs running up to $25 or $30. Usually a definite answer was given right then. In some cases written reports were requested, or jobs were large enough to require a detailed layout, estimate and quotation.

This company's wiring represents 50 per cent of its volume, while service jobs amount to 12 per cent. This leaves 38 per cent for appliance and fixture sales. Wiring jobs consist mainly of additions to existing systems in homes and stores, with an occasional factory job. Behind it all lies a simple yet effective service system that provides steady year-round revenue. It works this way.

In some homes the washing machine is inspected, cleaned and oiled every six months. The organ motor in a

(*Continued on page* 131)

Customer Response Analysis

From an Early Report of Actual Sales Resulting from Coupons

Direct Store Sales	Resulting Business
Electric Iron	5 sales $34.75
Mazda Lamps	7 sales 42.75
Lighting Fixtures	4 sales 33.55
Vacuum Cleaner	None

Inspections Requested	Requests	Actual Sales
Radio Inspection	31	$82.96
Wiring System	16	230.85
Motors & Control	None	None
Electrical Appliances	12	44.35
Lighting Fixtures	3	28.33
Direct Total Replies	78 Sales	$497.54

PUBLIC

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— or —

☐ 1 YEAR FOR $2.00 — REGULAR RATE

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ADEQUACY INSURANCE — *Novel policy form with ten numbered coupons which Schuck sent to 3000 ledger accounts and 2000 selected prospects. Read about the results.*

Novel Inspection Policy
Postage Will be Paid by McGraw-Hill Pub. Co.
No Postage Stamp Necessary If Mailed in the United States
BUSINESS REPLY CARD
First Class Permit No. 64 (Sec. 510, P. L. & R.) New York, N. Y.
ELECTRICAL CONTRACTING
McGRAW-HILL PUBLISHING CO.
330 WEST 42nd STREET
NEW YORK, N. Y.
IT'S A GOOD Policy to have your electrical system inspected once a year by a competent electrician.
Expires MAY 31, 1939
No. 15672
Issued to
MR. PROPERTY OWNER
Participating
Any property owner who takes advantage of the benefits outlined in this Policy can participate fully in the savings effected by a safe and efficient electrical system.
Good for one free inspection of your Motors and Control Apparatus
SCHUCK ELECTRIC CO.
Good for one free inspection of your Electrical Appliances
SCHUCK ELECTRIC CO.
Good for one free inspection of your Lighting Fixtures
SCHUCK ELECTRIC CO.

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Schuck recently sent out to 5000 homes a novel invitation, which looks like a folded insurance policy. It has an engraved gold border, bears a policy number and an expiration date. Inside are ten detachable coupons, of which five are good for special bargains on analyzed in an accompanying summary. It shows what electrical problems are of chief concern to home owners. It also indicates that many jobs of re-wiring, re-fixturing and general repairs are simply waiting to be sold. The Schuck Company dug them out and got action. Some were small fix-up jobs, but many involved worthwhile wiring and refixturing orders.

Handling the Inquiries

As free inspection coupons were received, they were routed for quick handling. Wiring recommendations were made orally and approximate prices quoted on jobs running up to $25 or $30. Usually a definite answer was given right then. In some cases written reports were requested, or jobs were large enough to require a detailed layout, estimate and quotation.

This company's wiring represents 50 per cent of its volume, while service jobs amount to 12 per cent. This leaves 38 per cent for appliance and fixture sales. Wiring jobs consist mainly of additions to existing systems in homes and stores, with an occasional factory job. Behind it all lies a simple yet effective service system that provides steady year-round revenue. It works this way.

In some homes the washing machine is inspected, cleaned and oiled every six months. The organ motor in a

(*Continued on page* 131)

•PUBLIC RELATIONS In Industry

What It Means to the Electrical Contractor— And the Opportunity that Industry's Problem Now Opens to Him.

PRESENTED BY

Electrical Contracting

A McGRAW-HILL PUBLICATION

An Editorial Service to Meet INDUSTRY'S MAJOR PROBLEM

To the readers of ELECTRICAL CONTRACTING

There is no doubt that today the American people are taking a keener, more critical interest in the conduct of business than ever before. And when I say critical, I mean exactly that. During recent years most of them have suffered loss, either of jobs or of savings, and under such circumstances men are prone to accept without serious question any scapegoat that appears plausible. In the confusion of fears and resentments, they seem to have concluded that short sighted and selfish business management is chiefly responsible for their misfortune.

However mistaken and unfair such conclusions may be, management cannot ignore them. It must recognize that in the long run, the opinions of men are the result of experience, of what happens to them each day, much more than of what they are told.

Progressive management has already faced that fact; has already begun to think and work beyond the technicalities of production and distribution that once absorbed most of its energies. It sees more clearly and deals more proficiently with its human responsibilities. It is learning to reconcile the economic success of the industrial unit with the social welfare of worker and community.

Presently, every business—the small retailer as well as the large manufacturer—must learn how to interpret more convincingly to its own public the social as well as the economic benefits of its policies and accomplishments. Only as each business satisfies the newly aroused and critical interest of people in its affairs will it be able to disarm those who trade on the human tendency to blame our troubles on someone else. Yes, if business as a whole is to win a favorable public opinion, each and every business must act to improve its own public relations.

The readers of this journal, and of other business publications, compose, we believe, a group that can achieve for American business a sound and lasting solution of this vital problem. They alone are in position to shape the working conditions of 21 million employees. They alone can mould the attitude of those other millions who compose the various "publics" to which all business must be responsible.

Heretofore, the function of business papers has been to exchange successful experience; to dig up and disseminate practical facts for the use of their readers, serving primarily the technical and merchandising needs of business. But this matter of human relations has now become of equal importance, for good industrial and public relations, it has been found, reduces corporate losses, removes fear and suspicion, promotes operating efficiencies in both production and sales. A better knowledge of public relations technique is, therefore, quite properly essential for men in, or moving into, positions of greater executive responsibility.

So, beginning with this insert, each McGraw-Hill publication sets out to strengthen its editorial service in the important domain of Public Relations. I hope that the million readers of McGraw-Hill's business papers will get much real and practical help toward building better relationships between their own businesses and their employees, their customers, and the communities in which they must carry on.

James H. McGraw Jr.

President, McGraw-Hill Publishing Co., Inc.

Why A PUBLIC RELATIONS PROGRAM?

IN less than two generations the United States has changed from an agricultural to an industrial nation. Living standards and efficiencies at once the despair and envy of other countries have been created. Foreign delegations still flock to our shores to study our methods so that they may use them as patterns for their own organizations. Yet here at home today these methods and the systems responsible for them are under increasing attack.

Since every person employed in productive enterprise is a part of American industry, these attacks imperil the livelihood of nearly forty million workers and their dependents. The newest addition to the payroll has as much—if not more—at stake as the veteran business executive. That also is true of particular industries which at present may not be under direct fire. All industry is so interrelated and interdependent that even the seemingly immune enterprise must suffer when the legitimate activities and the buying power of their customers, or the customers of their customers, are curtailed.

Ironically enough, public acquiescence in many of the current attacks is an indirect recognition of the satisfactory manner in which our industrial system normally functions. Reasonable opportunities for the employment of those ambitious to put their mental or physical talents to work, and continually rising standards of living have come to be widely accepted as a matter of course. Any unfavorable change in these conditions leaves the general public surprised, confused and resentful. Such reactions as these make it easy for pressure groups to unloose destructive propaganda which further heightens resentments and breeds new misconceptions.

These misconceptions take many forms shaped by the experience, the inexperience, or the special interests of the critics. To one it appears that business can't manage itself and must be owned and managed by the Government. Another believes that employees are underpaid or that stockholders and executives are overpaid. To others corporate surpluses are too high. Many have convinced themselves that power and machines have reduced employment opportunities; and that industry can raise wages and reduce prices while costs go up.

Several misconceptions are based on faulty generalizations. Because a few companies have been remarkably successful, it is argued that all could make money. Because some corporations have been ruthless, all corporations, it is contended, will stoop to unethical conduct to gain their ends. This is like saying: John Smith killed Bill Brown; John Smith is auburn-thatched; all redheads, therefore, are murderers. Unfortunately, those who would indict all business for the crimes of a few are more subtle in their approach and so create an impression not in accord with the facts.

To put it bluntly, American industry, once so highly praised for its contributions to the national well-being, is now on the spot. Prevailing misconceptions of how business operates and what it does have made a field day for those who propose to hamstring or destroy private initiative and individual opportunity. These proposals run a broad gamut: They include public ownership, increasing and rigid federal control at the expense of local autonomy, ill-conceived legislation on hours and wages, labor dictatorships, and confiscatory taxes on thrift and employment security.

While the man in the street may be criticized for his willingness to swallow these nostrums, he is not wholly to blame. Industry, too, has been at fault, in assuming either that he was fully informed on those phases of its operations which are properly a matter of public interest, or that a healthy curiosity should be discouraged. Misconceptions multiply where the facts are hidden.

The tragedy of the situation lies in the fact that it might easily have been avoided. In the simple days of local and localized industry, everybody connected with a particular enterprise knew everybody else connected with it, and the details of its operations were an open book. The boss and the employees were neighbors; the customers, for the most part, fellow townsmen. Outside purchases were limited largely to those products which the local community neither manufactured nor raised. Competition in the modern sense was practically non-existent.

As industry developed and enlarged its field of operations, much of this early intimate personal touch was lost. The small enterprise grew bigger. In some cases combinations took in the local business and financial control passed out of the community. The local industry which still retained its identity was busy meeting increased competition and seeking to expand its distribution. Little attention was paid to changing conditions that were fostering misconceptions about the personal relations of the business. Bit

1

American business has just come through nine years of depression and six years of political persecution. Some of this punishment was called for. But it has gone too far. The stability and progress of industry and the security of invested savings is now threatened. This has become a vital concern to the electrical contractor.

2

The electrical contractor is interested in the American manufacturer — like any other citizen. But also, this factory man is your customer. And it is well to understand your customer's problems, to be able to discuss them with sympathy and judgment. Right now he needs your help.

by bit the close acquaintance and familiarity of the early days disappeared.

Common understanding of these things also was impeded by the greater variety of occupations as industry expanded. Each man's job became so highly specialized that the old feeling of common partnership in a joint undertaking frequently was buried in an exaggerated feeling of the relative importance of his own work. This made it easy for each occupational group to get the idea that its contribution to the undertaking alone was essential and that many of the other groups were parasitic or, at best, unimportant.

Such mistaken beliefs are the exclusive property of no particular group. "Goods are valueless until sold," chants the sales staff; "without us the wheels of industry would cease to turn." "The wheels would turn much faster," growls the production department, "if we didn't have so many lame-brains drawing fat salaries as salesmen." Under the cold glance of both groups, the clerical force heatedly inquires: "How long do you think this business would last if we didn't keep the cost records, send out bills and collect the money for pay checks?" Some executives and engineers, too, have been known to forget that their plans cannot be carried out without the cooperation of other groups.

Possibly the greatest single cause of misunderstanding and friction has been fuzzy thinking on social responsibilities. Many of the responsibilities which rested on the individual or the state in our fathers' and grandfathers' days have been shifted to the shoulders of industry. New ones constantly are added or proposed—often before industry has had time to adjust itself to those which have gone before. Some of these responsibilities affect employee relations; others involve customer relations. The worker, for example, no longer is completely defenseless against the occupational hazards of his employment. "Let the buyer beware" no longer is considered smart merchandising. Many of the changes now embodied in the laws were anticipated by industry itself. Opposition—valid or otherwise—to social legislation, however, has been used to damn business in the public eye.

Fortunately, the barriers to good will and common understanding can be broken down. The process is a simple one. It consists chiefly in maintaining good policies in human relationships and in keeping all interested people—employees, stockholders and their neighbors, customers and the

general public—informed. It means telling them in plain terms what revenue is received and where it comes from, what revenue is paid out and who gets it, how an industry serves the individual, the community and other industries. Finally, it includes the acceptance of the social responsibilities which the advance of civilization imposes upon business.

Add all these things together and you have public relations.

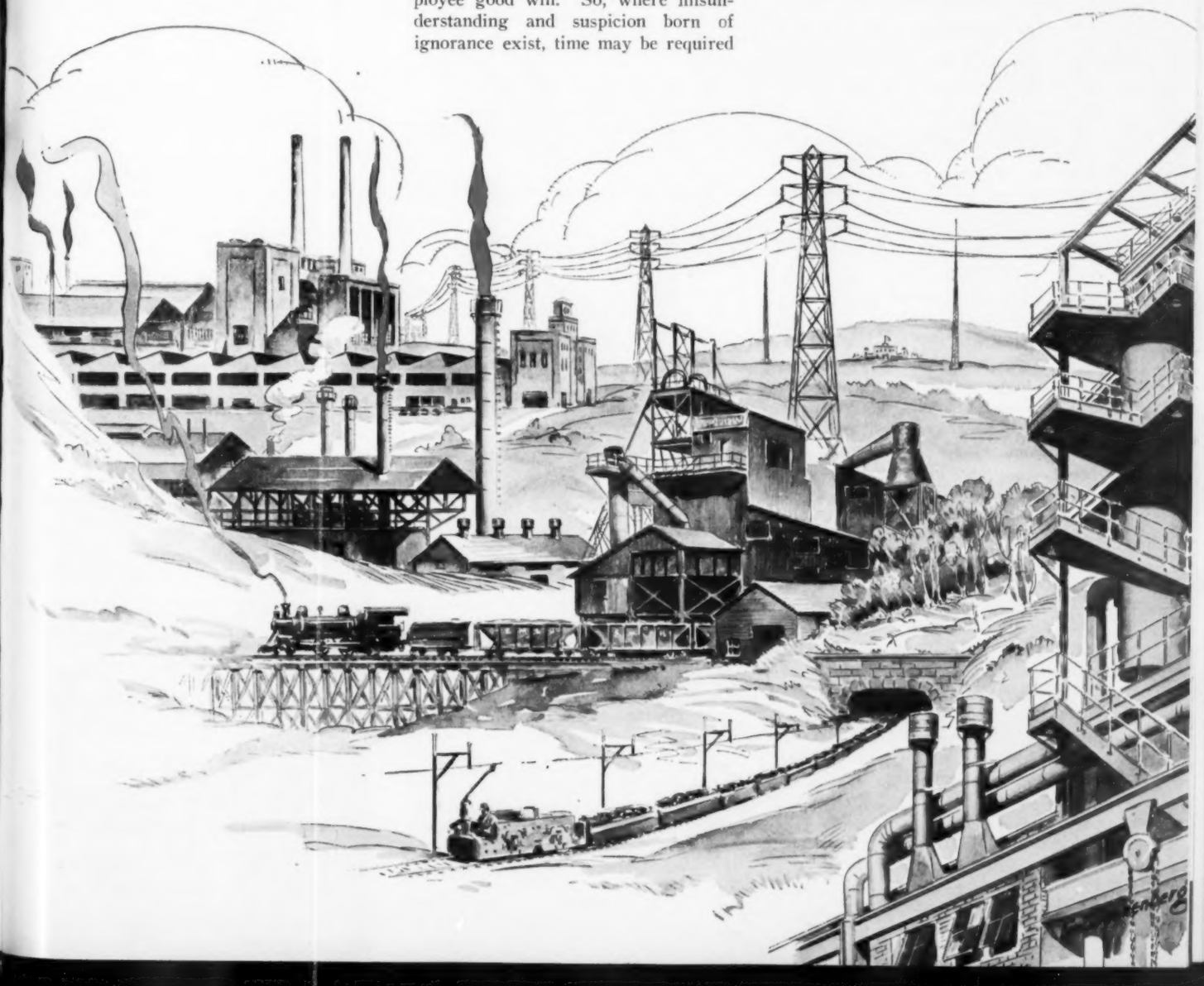
Most employers are willing to accept their social responsibilities, but they are inexpert in making that acceptance articulate. Too many employers have failed to make clear their policies, their practices and their purposes as they relate to fair dealing with employees, investors and the general public. Their intentions have been good, but they have cloaked them with a veil of secrecy and made a mystery out of simplicity. As a result the uninformed have been given a royal opportunity to exercise their imagination. And they have done it!

Public relations is a comparatively new activity for most business enterprises and involves a technique which too many have not yet learned. Obviously, the first place for each company to start is within its own organization. This is the "inside job" that builds a company's good name among its own family and lays the firm foundation for building public confidence and favor. As one exponent of the art phrases it: "Industry's public relations cannot be one thing and its private actions and policies something else. The two must be in complete accord."

The inside job should present no real difficulties to fair-minded employers. Most workers have a normal predisposition to view in a favorable light the organization in which they earn their livelihood. Most companies endeavor to conduct their operations so as to justify that favorable attitude. But too few of them are adept at dramatizing the facts that furnish a substantial basis for maintaining employee good will. So, where misunderstanding and suspicion born of ignorance exist, time may be required to break down the barriers that have grown up.

The task of telling this inside job to the outside world, however, will not be easy, for two reasons. First, it has been so long neglected that the backlog of misunderstanding is large. Second, public relations involves attitudes as well as actions, a viewpoint as well as an organization. Public relations is not a commodity that can be purchased like a car of coal or a bolt of silk; neither can it be sold by "canned" material. Each program to establish sound public relations must be individualized and indisputably stamped with the personality of the company promoting it. *And the deed must always back the word!*

But the task is worth the effect. For, with the inside job right, a properly conceived and intelligently executed public relations program offers business the means of successfully counteracting unjust public suspicion, unfair political attack and unwarranted outside dictation.



The ART of PUBLIC R

THIS whole matter of human relations in business, of course, concerns the large employer more than the small one. It affects the corporation that distributes its products broadly, more than a concern with only a few customers. So the average electrical contractor may feel that he need not bother his head about it. But it does affect him in two ways.

First—All his industrial customers are in it up to the ears. He should understand not only their problem but how to apply his service to its solution. This offers him immediate opportunity.

Second—He has his own relations with his own employees, customers and neighbors to consider.

From the standpoint of his own organization, the average electrical contractor has a simple situation. He has a relatively small number of people working for him. And aside from his office help, he is highly restricted in his relations with his men if he runs a union shop. The union supplies journeymen and helpers. They work for him throughout one job, perhaps, then are gone. A man with an open shop may hold his men longer but still is dealing with small numbers.

Therefore, we take it that this is not the chief interest of the electrical contractor in the whole subject at this time. It is the problem of his industrial customers that is really more important to him. This is because it points an opportunity for him to tie into his customer's need and open up new markets for his services. But first, before he approaches the market, he should have a pretty clear picture of how public relations are fostered by an industrial company, so that he will know how to help.

The basic elements are nearly identical, whether it be a manufacturing company, a mining operation, a lumber mill, a utility, a construction firm, a wholesale house, a merchant. Essentially it is all a matter of maintaining a contented and effective organization and a good name. The problem resolves itself into an inside job and an outside job.

The Inside Job of the Individual Company

In the development of good industrial relations within the organization, an orderly procedure generally accepted may be set down in six steps—

STEP 1—*Set Up a Leader*—This work needs the leadership of an able executive, with knowledge of the business and skilled in guiding human relations.

STEP 2—*Clarify Organization*—Uncertainty means an uneasy personnel inclined toward political maneuvering. The organization of the company should be clearly defined, so that the authority and responsibility of individuals may be known to all.

STEP 3—*Determine Personnel Policies*—A statement of the personnel policies of the company should be formulated by a committee representing all the management groups in the organization. It should be submitted for democratic endorsement and acceptance by representatives of the personnel, from top to bottom, and made known to all employees.

STEP 4—*Improve Personnel Efficiencies*—Strengthen those influences within the organization which increase the efficiency of the working force, the purpose being to advance the opportunity for the individual and the company through lower production costs, better service to customers, and improvements in the quality of product. Establish policies on—

1—Payment of prevailing wage and salary scales.
2—Evaluation of jobs and setting-up of uniform scales of pay for equal grades of work throughout the company.
3—Establishment of pay differentials, having due regard for responsibilities, requirements in skill, mentality, working conditions, and physical application.
4—Establishment of financial incentives also, where possible.
5—Setting up of positive procedures by which all changes in rates of pay are fully explained to the employees.

STEP 5—*Assure the Well-Being of Employees*—Look after the physical and mental well-being of employees by providing safe and sanitary working conditions and the plant services necessary for comfort. This means adequate ventilation, heating, cooking, lighting, the elimination of noise and, going a step further, suitable provision for rest, meal times and recreation.

The stabilizing of employment and the establishment of organized protection against unemployment, sickness, old age and death have far reaching influence upon both the physical and mental welfare of employees. So has assistance to deserving individuals in their problems of savings and housing.

3

American business realizes, at last, that it can expect no relief from government or politicians. It can hope for only four kinds of friends — its employees, stockholders, customers and its home-town neighbors. It must seek understanding, sympathy, cooperation and support in these four directions. But the electrical contractor has very practical help to offer.

CRELATIONS

STEP 6—*Train and Educate*—A suitable program should be developed for advancing men and women in the organization and as citizens of the community.

These six steps are designed to create and maintain on the part of employees a feeling of confidence in the management and satisfaction with their work and their future. This is the most important part of the "inside job" of public relations. But not only is it necessary to *do* the inside job. It is equally essential to let employees know that it is being done.

The Outside Job of the Individual Company

Having done a good job on industrial relations within the organization, the most important step already has been taken toward building up good will outside. The company is now in position to tell its customers and the public not what it aspires or pretends to be, but what it is and how it contributes to public welfare.

A. *For customers and prospects* there are many obvious facts about a company that are of interest—

1. Manufacturers of equipment and producers of raw materials that touch the lives of people only indirectly can show how their products raise the general standard of living.
2. Companies that sell their products or services directly to people can interpret the resulting social and economic benefits in terms of human well being.
3. Both types of organizations can publicize interesting facts about themselves, their policies and their products.
4. Through trade and industrial associations, local and national, all types of business can join in promotional programs for the information and education of the public.

B. *In the community where the company is located* people judge the company by the things they are told. They may get their information from individuals or groups who are not part of the organization and who are working for selfish ends. These people may or may not give facts. Or they may get their information from the employees themselves, who are prone to tell the truth as they know it.

A related method is the taking of an active and constructive part in community affairs. By becoming itself a good citizen and neighbor, a company makes itself known and liked. Here are types of community activities that have been used successfully—

1. Holding "open house" in the plant for visitation by the community.
2. Close acquaintance and cooperation with the local press following a policy of giving the whole truth and nothing but the truth.
3. Taking part in exhibits or expositions of the products of local industries.
4. Joining with other industrial companies in the community to disseminate facts and to create and maintain public good will.
5. Encouraging employees to participate in civic affairs.
6. Discussing company and community affairs with local leaders of thought, such as preachers and teachers.
7. Participating in the operation of a community foremen's club.
8. Circulating factory house organs to interested people outside the organization.
9. Presenting facts before civic organizations, women's clubs, luncheon clubs.
10. Showing plant operations by motion pictures in schools and before other groups.
11. Cooperating with local charities and character-building agencies.

C. *The Company Can Cooperate with Its Industry*—

By and large, an industry as a whole is represented by its trade association. This representative should, therefore, be able to act as a clearinghouse for the exchange of the plans and experiences of individual companies in the work of industrial and public relations.

A part of the clearinghouse job can be the collection of industry-wide statistics, even national statistics about industry, and their presentation to member companies ready for use.

D. *The Public Relations Job of the Community*—

In addition, there is the public relations job of the community which, carried out jointly by representatives of the individual plants, may promote local good will. Obviously, this group can be effective only as it presents facts about the community's industries.

Once this cooperative working group is under way in a community, it has unlimited possibilities for participation in local affairs. One of its most effective weapons is advertising in the local press. It has the opportunity to show that the welfare of the community as a whole and of all the individuals who live there is bound up with the welfare of the industries of the community.

4

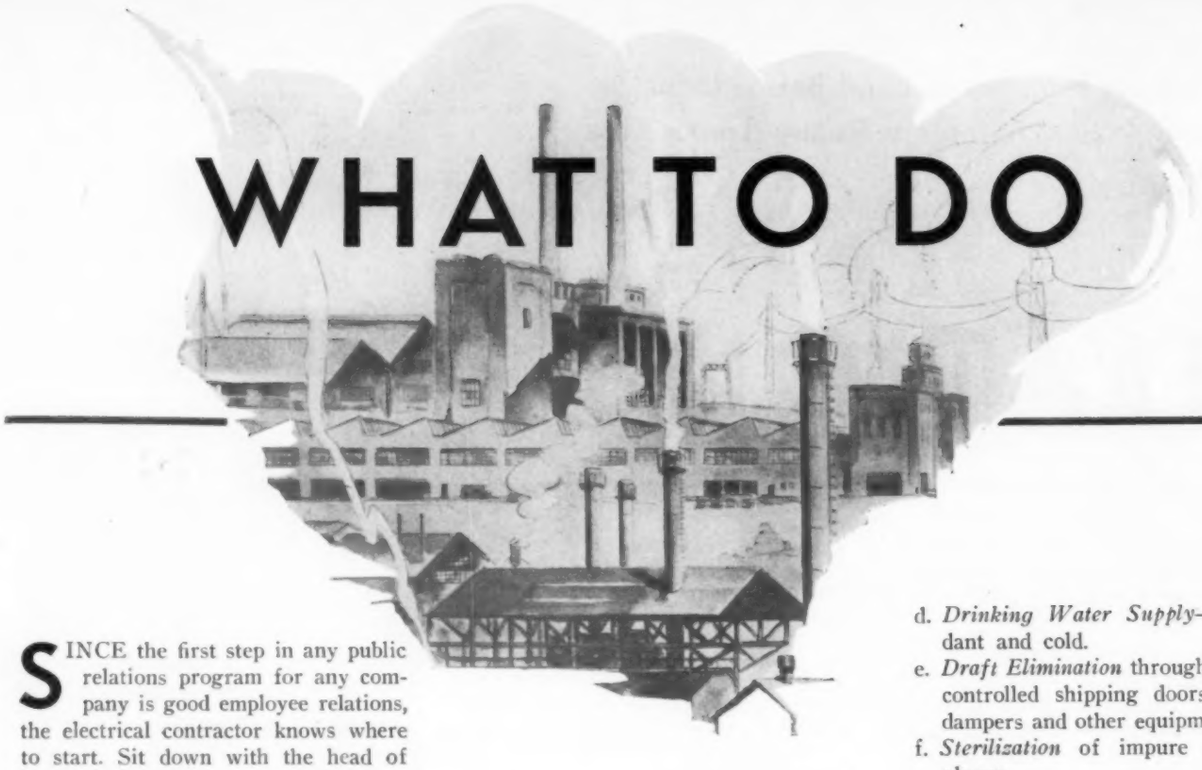
The most important friend to the American manufacturer — for any business — is its own employee. For if the man who works for the concern doesn't like it, trust it, speak well of it, who will? Therefore, before a company can build good will outside, it must win and deserve the good will and loyalty of its own people.

It is right here that the electrical contractor has a service to offer.

All this is actually part of one program, starting in the plant and working outward. The development of such a program entails a lot of thought and work. It requires a highly specialized technique. A capable man may be available within the organization, but the job is not one for an amateur. In the majority of cases some help must be sought outside. It may be found either by hiring an experienced industrial relations executive or retaining the services of an experienced management consultant with a good record of achievement. It is absolutely vital, of course, that the executives of the company be solidly behind the plan as a permanent function of management.

All this should be well understood by every electrical contractor, who is interested in industrial business. This whole problem is well front in the minds of management. The contractor will find it profitable to have an intelligent point of view on it.

WHAT TO DO



SINCE the first step in any public relations program for any company is good employee relations, the electrical contractor knows where to start. Sit down with the head of any industrial concern to talk about improving conditions in his plant and what have you to offer? Automatically you will see opportunities on every side. For example—

1. *To Promote Safety in the Plant* and give the worker more mental ease, with knowledge of greater security, you will recommend—

a. *Correct Illumination* where work is performed at dangerous machines or where there is danger of falls, bumps or burns.
b. *Hazardless Controls* which permit machines to be stopped or operated with minimum danger of shock or injury from moving machinery.
c. *Protective Alarms* which warn against fire, explosion hazards, machine abuse, sequence stopping, jammed conveyors.

2. *To Reduce Fatigue* and lighten the burden on the worker, so that they can work more happily and cheerfully with more good will toward their employer, you will recommend—

a. *Step Saving Control* buttons for lights, conveyors, motors, communicating devices, alarms.
b. *Automatic Regulation* of speed and temperature, reversal of machine travel and unloading and tripping devices.
c. *Correct Illumination* for lightening the visual burden, color discrimination, inspection and general production.

3. *To Provide More Healthful Working Conditions,* pleasanter surroundings that will reduce sickness, absence, slow work and low morale, you will recommend—

a. *Clean Conditioned Air*—free of toxic fumes or foreign particles.
b. *Comfortable Temperatures* —especially at isolated spots not provided for by normal heating facilities.
c. *Freedom from Excessive Heat*— by the use of localized electric furnaces or built-in heating elements.
d. *Drinking Water Supply*—abundant and cold.
e. *Draft Elimination* through easily controlled shipping doors, roof dampers and other equipment.
f. *Sterilization* of impure atmospheres.

4. *To Improve Accuracy,* without additional effort or anxiety—and thereby reduce waste, improve the quality of the product, and so increase production, you will recommend—

a. *Precision Lighting* at fine seeing tasks.
b. *Correct color* discrimination.
c. *Finger-tip Controls* and stopping devices.
d. *Automatic* electrical features.

5. *To Aid in Centralizing Responsibility* and thereby avoid unpleasant bickering, unjust reprimands and dis-

5

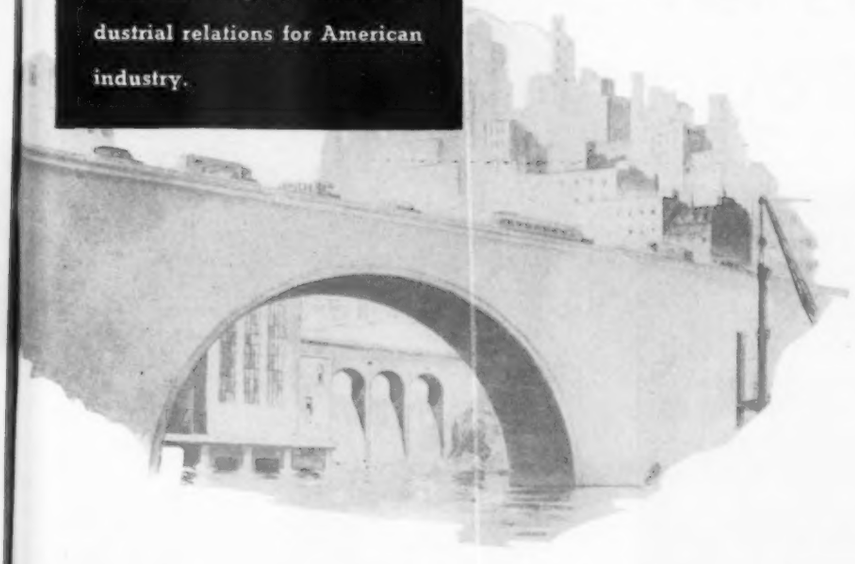
Good industrial relations, good will between any company and its employees, depend primarily, of course, upon working conditions in the plant. Unless management cares and sees that the workers have good air, light, heat, sanitation, convenient power and control, safety and other comforts, plus good hours, pay, treatment and opportunity — watch out!

Most of this is the electrical contractor's business.

How to Give Effective Aid to Your Industrial Customers in Improving Their Employee Relations

6

Here then is the opportunity for the electrical contractor to help with this pressing national problem, and expand a market at the same time. In a word — better light, air conditioning, more power, ease of control, safety precautions and increased production have become the keys to better industrial relations for American industry.



gruntled workers, you will recommend—

a. *Recording instruments*
b. *Correct protective devices*
c. *Fact-finding meters*
d. *Automatic alarms*
e. *Supervisory systems*
f. *Handy intercommunication and signals.*

In a word, you will take all these applications of electricity, which in the past we have been accustomed to group under the head of "modernization", and restyle it to the present need. You will hitch your wagon to the new, bright ascending star. You will recast your service in tune with the present trend of thinking, throughout industrial management.

It is not a trick. It is not a subterfuge. It is an intelligent reorganization of your sales approach. For the industrial executive does not want you to call and talk to him about better lighting or air conditioning or improved control, a new signal system or anything else that you have to sell. That's your business. His business is the management of an organization, the production of goods. And the biggest problem he faces, in this field of his pressing thought, is the matter of human relations—he wants to know how can he improve working conditions, reduce labor troubles, increase output and build good will among his workers, his neighbors, his customers, his stockholders.

He can't do it by magic. There is no "Abacadaba" he can use. He can only do things that are practical, if he is to get results. And it just so happens that these services, which the electrical contractor has to offer, provide the basic benefits that are needed in improving industrial relations. And there you are!

The present stress in the field of public relations, therefore, opens new doors and opens all doors wider for the electrical contrator into these industrial plants. The opportunity beckons. It calls you in to recommend and demonstrate and sell and install many types of equipment, among which the following stand out—

—Controls for motors, heating devices, lights.
—Auxiliary controls, such as stop stations, circuit switches, pressure switches.
—Lighting equipment.
—Alarms, sirens, gongs, visual signals.
—Recording and indicating instruments.
—Ventilation and air conditioning.
—Sterilizing and irradiation devices.
—Signalling and inter-communication.
—Motorized tools.
—Electronic testing and measuring apparatus.

With this approach every electrical contractor should call anew on every industrial plant in town, to talk—not electrical equipment—but the present problem of industrial relations. The purpose of his visit will be to offer to management ideas and help—where it is needed. Business will come out of it—business at a profit.

...and Then

YOUR OWN PROBLEM

What Should You do for Your Own Employees?

NO man can read the earlier pages of this statement without thinking of his own human relations problem, things he could and should do to improve the working conditions and raise the morale of his own organization. For the electrical contractor, the possibilities here stand out so clearly that few words are needed to list them. They come under two heads—

1. *Contributions to the Security of the Workers that Win Good Will—*

a. Group insurance covering sickness and accident.
b. Hospitalization insurance.
c. A credit union to promote savings and provide loans.
d. Home purchase plans.
e. Safe and comfortable working conditions.
f. Safe and efficient tools that reduce fatigue and increase the workers' earnings.
g. Materials of the best quality, that require the least effort to install.

2. *Policies of Fair Dealing that Contribute to the Worker's Peace of Mind, Ambition and Opportunity—*

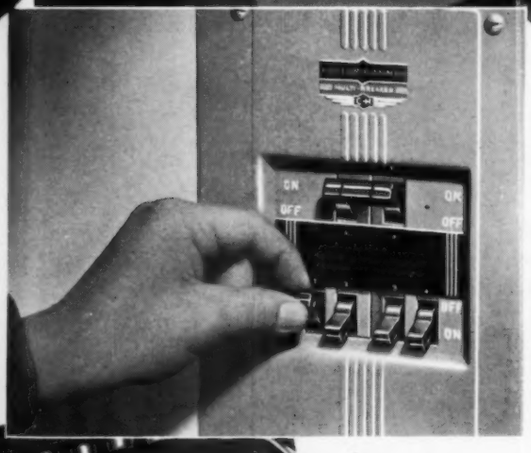
a. Encourage a mutual cards-on-the-table policy with regard to new legislation, working conditions and political developments.
b. Avoid jurisdictional claims and disputes.
c. Support all activities tending toward worker training. Supply useful data and literature. Encourage periodic discussions of methods.
d. Prepare good working data and provide intelligent supervision.
e. Avoid "rush" jobs and strive for continuity of employment.
f. Work out bonus or commission plans, wherever the nature of work will permit.

This and the other listed objectives of a good industrial relations program constitute *your* "inside job." It will pay every electrical contractor to study it well and make the most of it.

7

What we have long talked of as "modernization" or "industrial rehabilitation" now steps out as the practical means of building good will for industry, better public relations for management, prestige for American business. And we hitch our useful sales wagon to a new and brilliant star.

A BUSINESS GETTER IN THE BOOMING HOME-BUILDING AND MODERNIZING MARKET



THIS in the kitchen

Instead of

THIS in the basement

Means

Prestige, Profit, More Business

Contractors report that the Cutler-Hammer Multi-Breaker has no equal for selling jobs of electrical modernization. Extensive rewiring projects frequently start with merely the sale of a Cutler-Hammer Multi-Breaker installation.

Installed in kitchen or wherever convenience dictates, the C-H Multi-Breaker provides a circuit breaker for each branch circuit. To renew service after overload, the householder simply resets the proper toggle. Nothing to change. Nothing to replace. Nothing to get out of order.

Working parts factory-sealed in a heavy Bakelite case, the C-H Multi-Breaker is practically indestructible. Constructed for ease, speed and simplicity in wiring and installing. For flush or surface mounting.

THE CUTLER-HAMMER MULTI-BREAKER

Ending forever the nuisance of blown fuses, the Cutler-Hammer Multi-Breaker appeals instantly to every home owner or builder. Contractors gain prestige, quick sales, extra profits by featuring its ultra-modern convenience

Beyond any doubt, the Cutler-Hammer Multi-Breaker is a winner—a winner whose spectacular present success is but a promise of its even greater future. Architects snap it up for their plans. Home owners enthuse over it. Speculative builders feature it. Contractors profit by its quick acceptance and gain prestige through recommending it for new homes . . . find it the open door to extra profits as an entering wedge to get electrical modernization jobs. Power companies laud it as a real answer to the problem of needless and costly service calls. Alert electrical wholesalers need not be told twice that the Cutler-Hammer Multi-Breaker is the type of "winner" it pays to push. CUTLER-HAMMER, Inc., *Pioneer Electrical Manufacturers,* 1306 St. Paul Avenue, Milwaukee, Wisconsin.

ADEQUATE WIRING

CUTLER-HAMMER

SERVICE CONTROL

C-H

When *You* Sell More Light–

THEY SELL MORE GAS!

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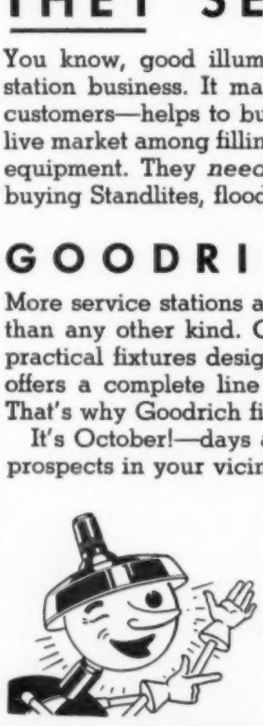
It's October!—days are getting shorter! It's time *now* to see the prospects in your vicinity.



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ELECTRIC COMPANY
OFFICES IN ALL PRINCIPAL CITIES

GENERAL OFFICES & FACTORY, 2902 NORTH OAKLEY AVENUE, CHICAGO, ILLINOIS

MAIN ST. LIGHTING

This typical Main Street is just like *your* Main Street—full of places to sell lighting-wiring. Study it and go after the business. It is yours if you want it.

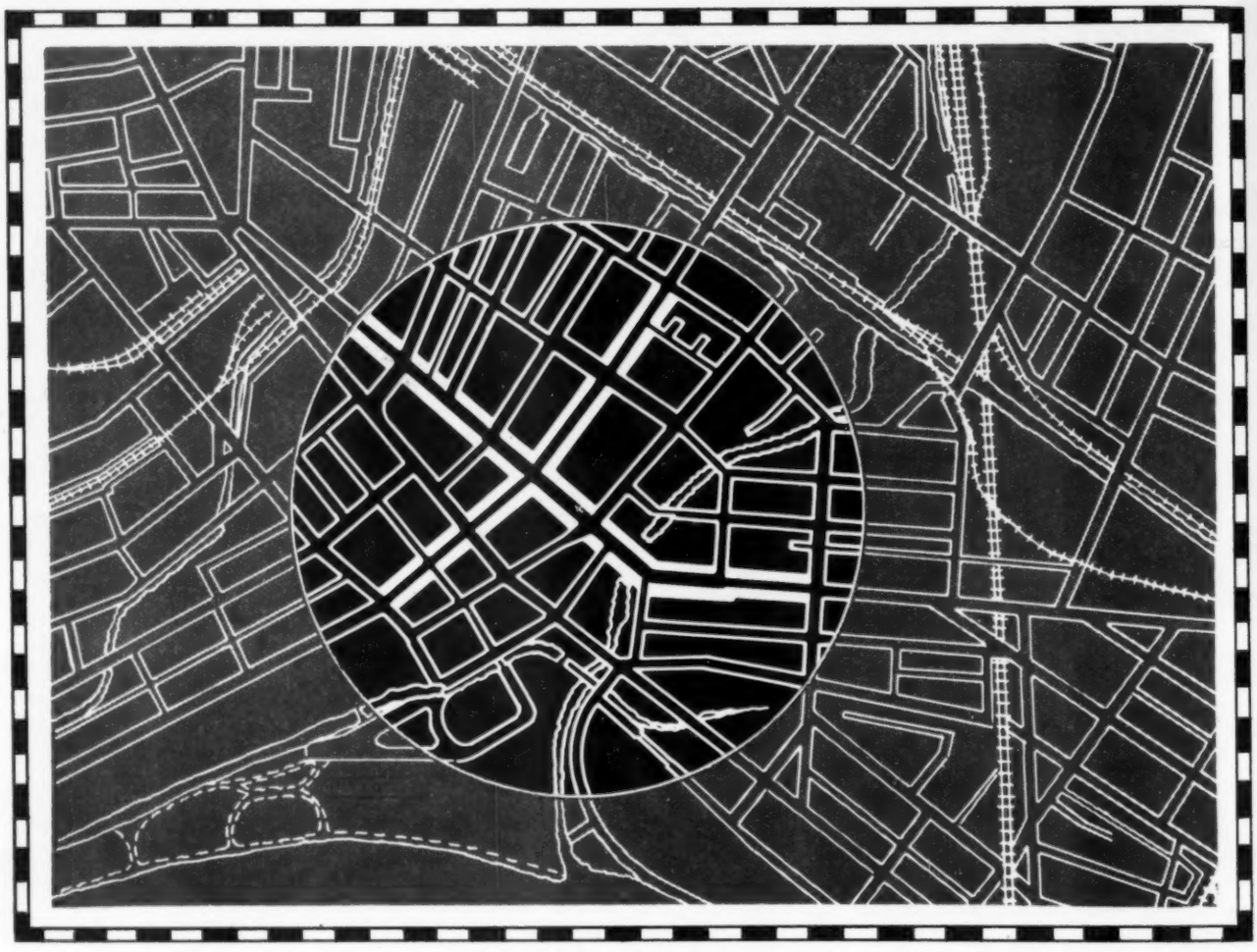
EVERY town has a Main Street. But few men in the lighting business know this Main Street well enough to sense the opportunities it offers them. So here is an example, a case study of a "Main Street" in "Survey Town," a hustling city in the Eastern tier. This investigation was made jointly by an ex-contractor and a lamp man. They went there to find out—to show you—the kind of business that is waiting on anybody's Main Street for the man who wants to sell lighting—and the wiring that goes with it.

And what is this "Survey Town?" It is a typical American city with its usual array of large and small shops, and offices above them. These places of business are densely located "downtown." They thin out into several outlying community centers—just as in your town. This article points out what kinds of storekeepers there are on Main Street in "Survey Town," and what its merchants lack and are interested in, as concerns lighting.

Actual door-to-door investigations were made in "Survey Town." But it was not just a Census of Business. This survey was made by looking in on merchants in various kinds of stores, learning how they use light in merchandising, gleaning from them how illumination applies to their particular competitive problem. And it was done to get ideas for you, to help you sell more and better light along your Main Street.

In this "Survey Town," where more than 125,000 people work, play and buy, are 2721 retailing establishments. Scattered around the outskirts are about 1000 more merchants. They all compete for business, for customer good-will and for prestige. Needless to say every one of these businesses uses light to

START DOWNTOWN *to find your store lighting market. Merchants need your year round help.*



YOUR MAIN STREETS, *regardless of length or store density, have similar lighting needs.*

NIGHT SCOUTING *reveals the need, daytime selling puts dollars in your pocket.* ▶

some degree as an appeal for customers, and these merchants then are just like your customers, in your community, only varying somewhat in number according to population.

For every 1000 people living in "Survey Town," there are about 20 stores—2721 in all. In addition, there are 1000 more stores in the county and suburbs. These stores range from a total of 869 that sell food, to lesser numbers for perhaps a hundred other classifications—just as in your town.

And just as in your city, there is a shopping center in "Survey Town," where the most merchants are concentrated. So an intensive study was made in eight downtown blocks. Here, taking two blocks in all four directions from the main cross streets, there are actually 257 stores in operation. In addition, 32 vacant storerooms were counted. Their importance is explained later. Downtown "Survey Town" has 26 major classes of stores and 27 other miscellaneous kinds. Your Main Street is quite similar except that the total number will vary. The big job is to take your Main Street apart in this same way to learn its makeup, its business structure. Then you can go to work on the kinds of stores you know should be sold first.

As was expected, it was found that on Main Street in "Survey Town," as it is with Main Streets everywhere, there is the same variety of stores: women's wear, men's shops, food markets, florists, barber shops. Each kind of store has a particular appeal to keen shopper senses. This appeal may be color, cleanliness, dignity, comfort, sparkle, or some other equally important point. And the interpreting of these points in terms of lighting is the key to every lighting man's Main Street opportunity.

The only difference to be found between one town and another lies in the matter of numbers. Some Main Streets are longer, have more stores, more tributary shopping streets. So in considering your Main Street in comparison with "Survey Town's" Main Street, bear in mind that the State Streets,

Census of Stores in Survey Town

Here is the Market that Waits for Some Smart Contractor

Food Stores	**869**
Bars, Cocktail Lounges	**306**
Barber Shops	**254**
Beauty Parlors	**144**
Wearing Apparel	**142**
Shoe Repair Shops	**128**
Filling Stations	**123**
Eating Places	**110**
Automobile Sales and Garages	**103**
General Stores	**85**
Furniture, Household Goods	**79**
Bakeries	**73**
Drug Stores	**68**
Lumber and Hardware	**64**
Jewelers	**44**
Florists	**42**
Liquor Stores	**25**
Other Stores	**62**
All Stores	**2721**

Broad Streets and other contiguous shopping blocks are included in this broad approach.

Condition- in this lighting market in "Survey Town" were found to be no different than they are in other cities. There are bright spots and dark spots. There are rival food stores competing by lighting appeal. There are other stores competing with adjacent filling stations or nearby chain bakeries. There are some alert merchants whose windows dominate the block. Other stores are sleeping in the dark and wondering why business is bad.

As along your Main Street, there are many stores that have floors of offices above. Here are doctors, dentists, lawyers, insurance brokers, real estate agencies, and many others. Every office needs light for doing day-long seeing tasks, especially during winter months. Too few offices have enough light, nor the corrcct type of light for office work. Many of these upstairs concerns have been neglected by the local lighting men, as in your town, because there are so many such prospects they hate to undertake the task of seeing them all.

This study of lighting conditions, this analysis of the Main Street lighting market, has been made to indicate to other contractors how their own Main Streets may be taken apart and appraised. For the same kind of a check-up in your own home town will show up a similar situation.

Naturally, you can not plan an attack on the lighting needs of 2721 retail stores. But you can boil it down to 289 Main Street merchants, and start in on the 19 eating places, or the 31 men's shops. That is easy. Right now, you know more about a certain type of business than another, how to sell new ideas there better than elsewhere, how to analyze their particular needs. But have you checked up on how many of this kind of merchant you can work on in your town? When you do, the starting will be easy.

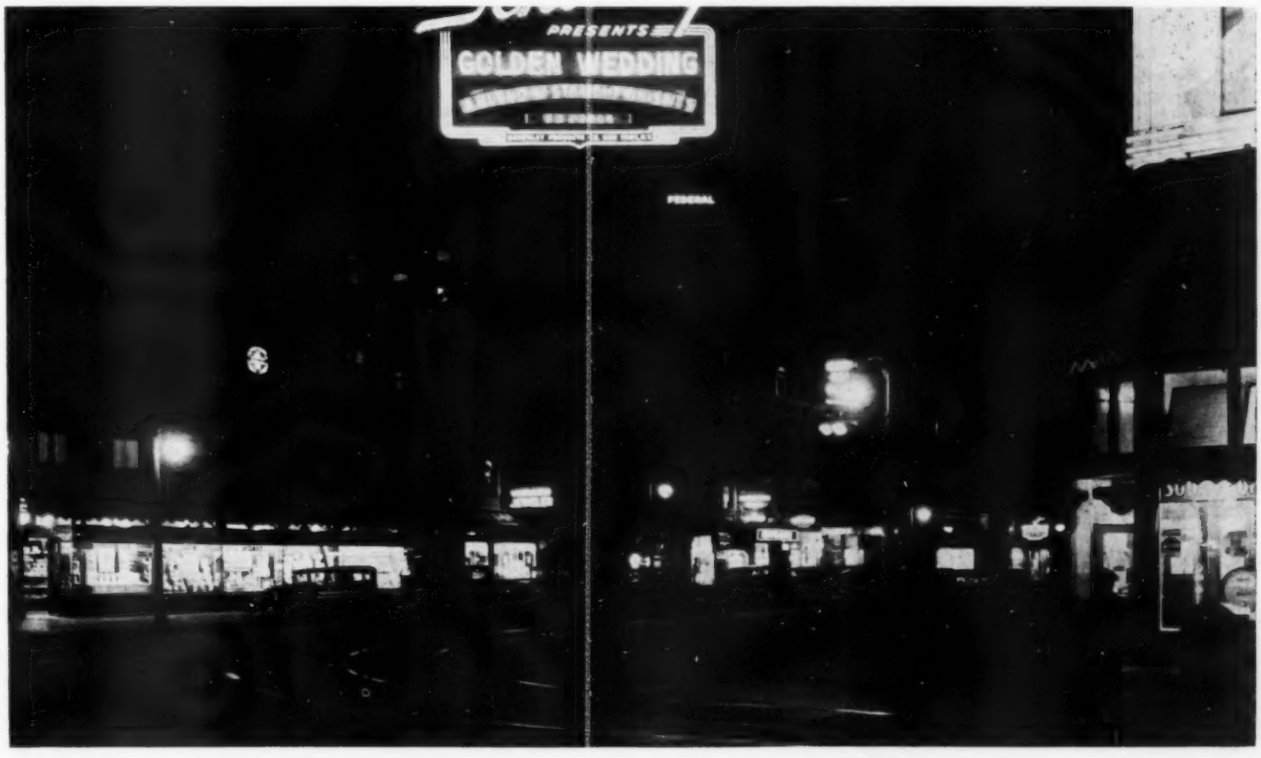
Downtown Main Street is not just a place to dodge as a bad parking spot. Traffic is also heavy on its sidewalks. Maybe you have been avoiding it when you should be studying it for new ideas. New faces appear among its storefronts, and they usually present new lighting applications, new eye-appealing effects.

Main Street is a free show and a fine laboratory by day or night for light-minded contractors. Have you checked up your Main Street with this in mind? If not, take a tip from "Survey Town"—Carry a notebook. Jot down important ideas, new firm names, or glaring evidences of lighting needed. Then organize and sell them.

ALONG EIGHT BLOCKS OF MAIN STREET

All These Stores Use Light to Help Them Sell.

Women's Wear	32	Children's Shops	5
Men's Shops	31	Paint & Wall Paper	5
Restaurants	19	Electrical and Radio	4
Shoe Stores	18	Cigars	4
Furniture, H. H. Goods	18	Shoe Repair and Shine	4
Department Stores	9	Hotels	3
Millinery	9	Liquor Stores	3
Jewelry	9	Music	3
Drugs	8	Gifts, Antiques	3
Chain Variety	7	Fruits and Vegetables	3
Theatres	6	Food Markets	3
Candy and Nuts	6	Delicatessen and Meats	3
Optical Stores	6	Other Stores in 27 Classes	31
Banks	5	Vacant Store Rooms	32
		All Business Establishments.	289



What Different Merchants NEED

Store lighting along any Main Street is far from being standardized. Each merchant's individual situation and needs must be analyzed

IN "Survey Town" a careful check-up was made among 20 classes of merchants. They all needed slightly different treatment with respect to one phase of lighting or another. In all stores the general interior lighting is highly important. But in not all of the 20 classes of stores is show window lighting equally important. On the other hand, for florists and drug stores, for example, the quality of window lighting is more important than the interior lighting.

So it is with other items, like spotlights, show case or wall case lighting, interior display lights, color matching units, interior directional signs. In some stores these auxiliary facilities are essential. In others they are merely helpful, under various conditions. In certain stores these specialties were only found to be important under unusual circumstances. The accompanying chart shows the relative importance of nine kinds of store lighting as it was found in these 20 different types of stores in "Survey Town."

It will pay you, therefore, to go down your Main Street and analyze your commercial lighting prospects on the basis of this chart. Instead of finding your sales objective limited to general interior lighting only, and show window lighting, you will find yourself embarked on a nine-point program. You will find that every store presents some possibility. A short walk in your downtown district, or in a community trading center, will show surprising possibilities. You will see many places to present useful lighting recommendations.

Some stores and offices located along your Main Street are better than others. It is the same in "Survey Town." Some merchants are therefore better prospects, not only because of their progressive-

Nine Focal Points of Lighting

	GENERAL INTERIOR	SHOW WINDOWS	WINDOW SPOTS	INTERIOR SPOTS	SHOW CASES	WALL CASES	SPECIAL DISPLAYS	COLOR MATCHING	DIRECTION SIGNS
Men's Wear	M	M	A	X	A	H	H	A	H
Shoe	M	M	A	X	H	X	H	X	H
Women's Wear	M	M	A	A	A	A	A	A	H
Florist	M	E	A	X	X	H	X	X	X
Jewelers	M	S	A	H	M	M	X	H	X
Grocery	M	S	X	X	X	X	X	X	H
Butcher	M	S	X	X	A	X	X	X	X
Baker	M	M	X	X	H	H	X	X	X
Cigar	M	E	X	X	X	X	X	X	X
Paint and Wall Paper	M	S	X	X	X	M	A	A	X
Drug	M	E	H	X	A	A	H	X	H
Auto Show Room	M	M	A	A	X	X	A	X	X
Confectioners	M	S	H	X	A	H	H	X	X
Furniture	M	M	A	A	X	X	H	X	H
Millinery	M	M	A	A	X	H	H	X	X
Beauty Parlor	M	S	H	X	X	X	H	X	X
Liquor	M	M	X	X	X	H	H	X	X
Shoe Repair	M	M	X	X	X	X	H	X	X
Music	M	S	H	H	X	X	X	X	X
Variety (Incl. Chain)	M	M	A	H	H	A	A	X	A

M—Must Be Good E—Extra Good—Even More Important than Interior S—Secondary—Less Important than Interior A—Advisable H—Helpful, under many conditions X—Only important under special conditions

SHOPPING ENHANCED *by comfortable and harmonizing lighting effects makes money for this modern office supplies store.*

ness, financial standing and location, but because more of the nine kinds of lighting have been overlooked. You may be able to point out several of these applications that will help the merchant overcome competition from a neighboring store.

This chart of the nine basic uses for light in stores can be made an effective guide in selling. Your own chart can include other stores than the 20 classes tabulated here. Make your own additional notes to cover other lighting applications. This listing of the major applications is given to guide you to store lighting ideas that offer you the best hope of immediate results.

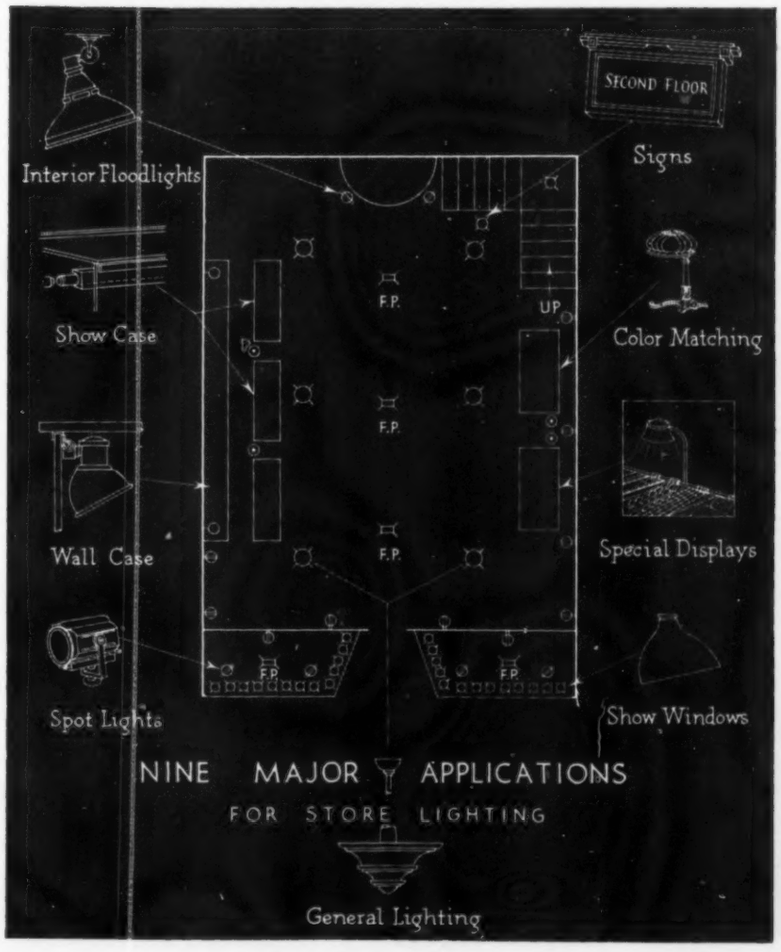
The offices in your town also have problems. Here the elements of dignity and prestige, worker comfort and efficiency are to be considered. Your principal guide will be the bulletins and hand books provided on this subject by the commercial lighting fixture and incandescent lamp companies.

Study the work performed at typist desks, at office machines, at other points. Lighting ideas will suggest themselves. Offices likewise have applications for special lighting effects. There are places for feature displays, directional signs, ornamental or decorative effects such as false lighted windows and ceilings. This is most generally true in banks. But keep an eye open for similar applications in other offices.

It is your job to sell ideas, and this is easy if you keep informed about all new lighting developments that can serve as door openers for you. Fluorescent Mazda lamps are now available for many kinds of decorative and color display effects. In wall cases, recesses, coves, refrigerators, they offer possibilities. This is obviously one of those "extra" or "plus" items to introduce among your Main Street prospects.

When you have studied your Main Street and every store and office has been analyzed, what to do next will be apparent. For your Main Street stores need just what they need on Main Street in "Survey Town."

NINE APPLICATIONS *apply to most store lighting needs, in varying degrees of importance. Know them well.*



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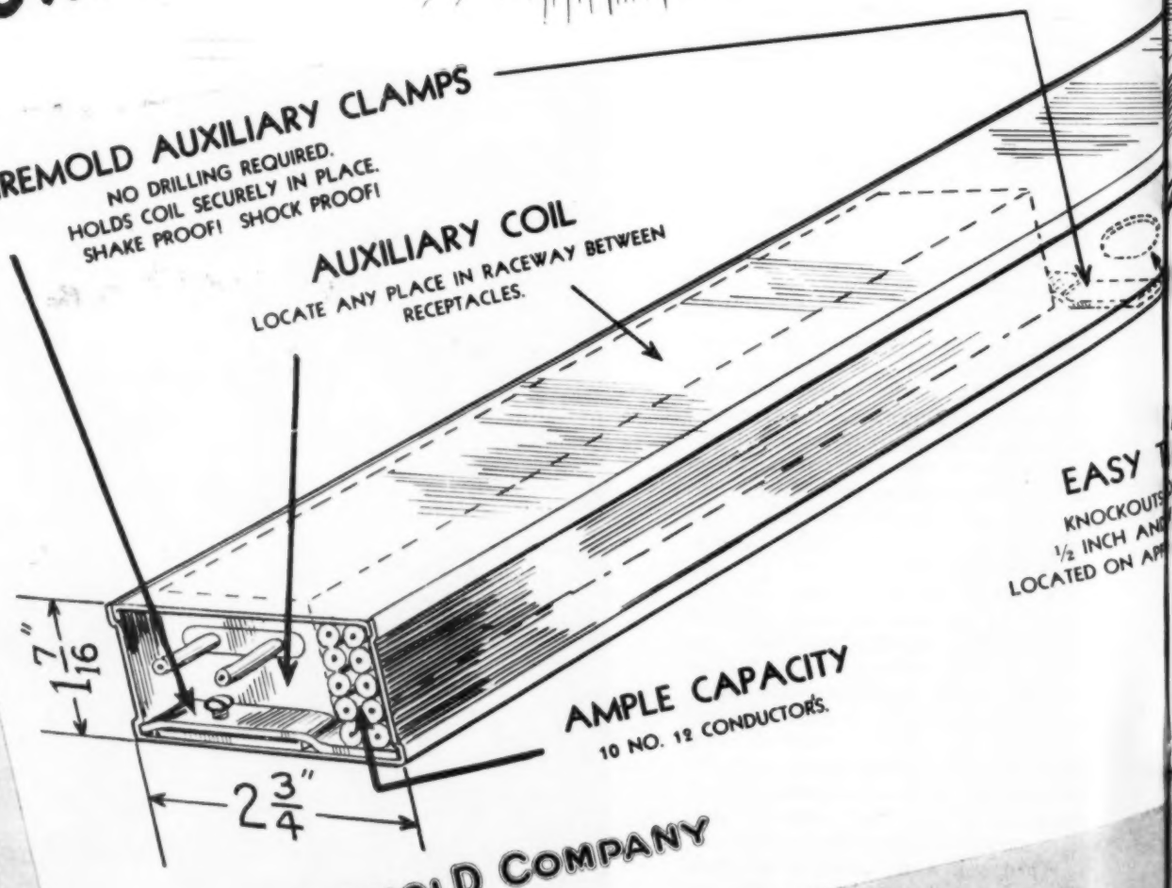
WIREMOLD Fluorescent St



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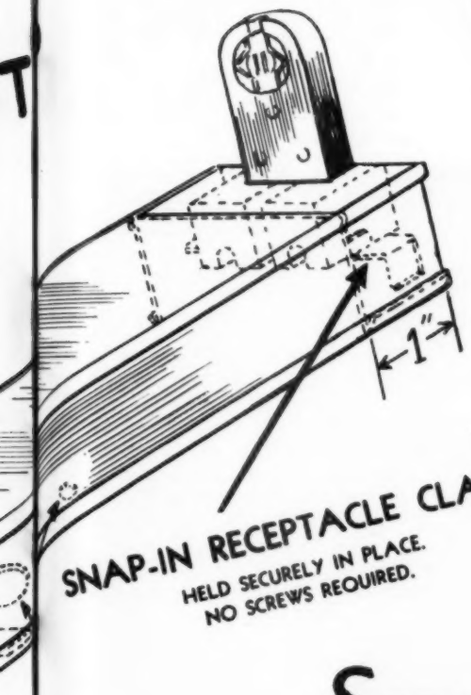

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The Quest for Prospects

GLARE BARRIERS—*This over-done bare-lamped grocery screens out the public's gaze with glare—and pays extra heavy light bills, too.*

Find the Evils in Store Lighting and You have Found a Customer and Maybe a Wiring Job.

LIGHTING prospects seldom come and look you up. To find them quickly and to have direct and logical reasons for making your call, you need some quick survey methods. You must develop the ability to recognize the major lighting evils at a glance.

It is a simple trick if you are armed with a few simple fundamentals. Your tools are a pair of good eyes, and a knowledge of "what to look for." Next is to know what indicates a prospect—to know when you're on a fresh trail. The big job on your Main Street is to look for clues.

And here are some simple rules for finding lighting prospects:

1. DIM WINDOWS. The show window is the face of the store, so its lighting effect deserves your first attention. It should be easy to determine the suitability of the lighting intensity used. Comparison with neighboring stores, suitability for its neighborhood, effectiveness in showing off the display, should be considered. There is no need for a foot-candle meter for such observation. Show window lighting is measured less by actual units of lighting than by the effect.

2. OVERLAMPED WINDOW REFLECTORS. A common indication of a lighting prospect is the use of oversized lamps in the original reflectors. The merchant, you see, is already sold on higher levels of illumination, yet his makeshift methods result in a loss in light and overloaded circuits. Here is an entering wedge to check the voltage and circuit loads. Persuade him of the effectiveness of the right reflectors for each lamp size.

3. NO REFLECTORS. Naturally the absence of reflectors is an immediate evidence of a lighting need. Every merchant should be interested in building up the intensity of light on his displays. Without reflectors, he is lighting the upper parts of the window to a higher intensity than the lower. Not only is he losing light that could be effectively thrown on the merchandise, but he is destroying contrast which is helpful.

4. MISSING OUTLETS. Look around the window for absence of convenient outlets. In most stores rotating and mechanical displays are commonly used. Stores that sell electrical equipment are naturally exceptionally good prospects, such as: furniture, jewelry, druggist, department, hardware, music, and variety.

5. HAYWIRE FOR PORTABLES. Convenience outlets on the ceiling are necessary for the effective use of spotlights. Dangling cords, leading to reflectors from which the regular lamp has been removed, are concrete evidence of the need of better wiring. Most spotlights and floodlights are in excess of 250 watts. The use of sockets as a means of attachment, therefore, invites trouble.

6. INSIDE THE STORE. In the store, the first thing to observe is the question of intensity. In extreme cases, naturally it is evident immediately. But it should be emphasized that the eye is not too good a judge of lighting at the levels usually used for store interiors. The difference between 5 and 10 foot-candles or 10 and 20-foot candles should be noticeable, but a light meter will do much to emphasize this difference.

7. OBSOLETE EQUIPMENT. While the illumination level is important, it often is less effective as a sales point than other factors of interior lighting. For example, are the units out of date? In the field of commercial lighting, improvements come each year. They soon make present installations obsolete. When fixtures have been in place 15 and 25 years they definitely mark the store.

8. POOR TASTE. Besides being out of date, fixtures are often out of place. Through poor judgment, or over-zealous salesmanship, units may have been installed that have no place in a particular type of store. This frequently happens because of a change in tenancy or ownership. But because lighting installations are relatively cheaper than other store fixtures, they need not be considered as permanent as the walls and foundations. Sell them what is right. A jewelry store needs different lighting than a women's wear store. What is suitable for either of these would seldom be the best for a grocery store.

9. IMPROPER APPLICATION. Occasionally the inappropriateness of a fixture is not immediately noticeable. For example, an enclosing globe that has a decidedly yellow or amber tint should not be used where color is involved. In the average men's shop, critical color matching calls for special units. For practically everything is identified in some way by color. To create the wrong impression by giving the store a general yellow tone does not help the merchandising.

10. DARK ZONES. The absence of lighting must also be considered. As you enter a store can you see the goods displayed in wall and show cases? Is there some barely noticeable display at the back of the store that should be visible?

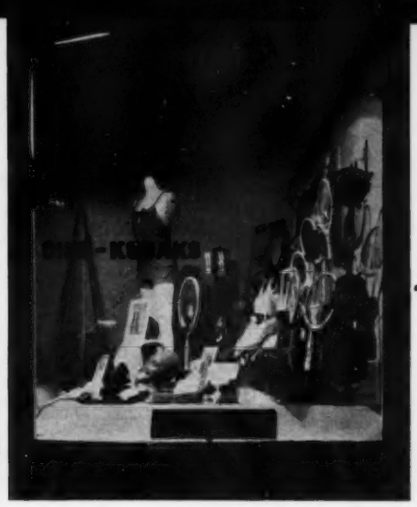
11. LACK OF SIGNS. Different departments should be identified. The absence of signs requires the customer to waste shopping time.

All of these aids are quite obvious, once you begin to look critically at store lighting along your Main Street. They will become even more obvious if you photograph them. The best proof of this is the accompanying pictures snapped during the check-up in "Survey Town."

Snapshots like these are a great aid to selling. So get the habit of taking them as you go about your city.

BUSIEST CORNER—*Mid-Victorian lighting in a tobacco window at "Survey Town's" busiest corner makes the wares look out of date.*

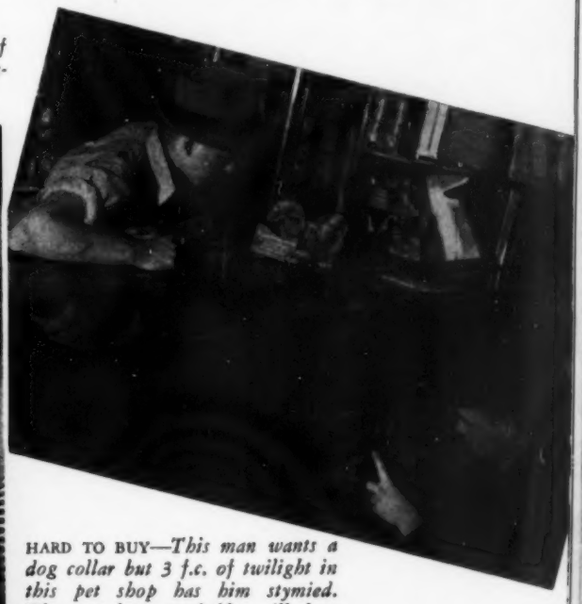
LIGHTS OR FLOWERS—*This Main Street florist lacks special color spots and blinds the view with ill-chosen tube lighting.*



BELOW PAR—*Sandwiched between bright stores, shops with only one light per window lose prestige, as with this store's display.*

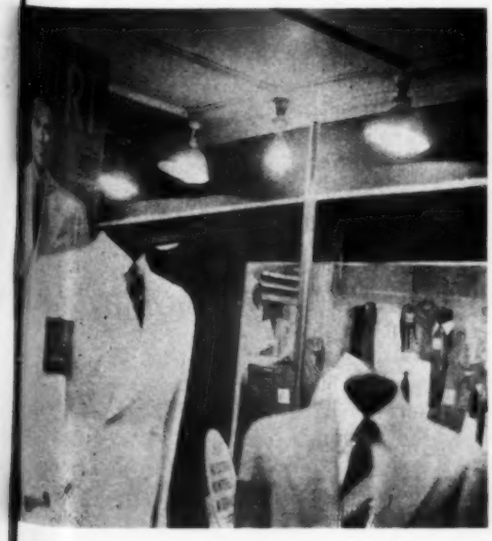
DRONE SALESMEN—*Dark store windows repel movie crowds next door and keep this twilight-zone merchant on the sidelines.*

OBVIOUS EVILS—*Every town has examples of over-lamping like these haberdashery windows. They are most obvious at night.*



HARD TO BUY—*This man wants a dog collar but 3 f.c. of twilight in this pet shop has him stymied. The merchant probably will lose in a much-wanted order.*

OVERLOAD EVIDENCE—*These over-lamped reflectors kill the effect of well-planned displays and need relief from tight wires.*



HALF DONE—*Good intentions went awry with this bank's floodlighting. A job awaits the man who will smooth out the dark spots.*

POORLY PLANNED—*These recessed sign reflectors and reflecting bonnets on lamps will not stop shoppers along Main Street.*

Make *Lighting* fit the Store

In every different kind of store there is a specific something that the surroundings should express or symbolize to its customers.

LIGHTING must be keyed to each store's customer appeal. In dress shops it is "style", for florists "color", and so on for various kinds of stores. Lighting properly treated, accentuates or emphasizes these customer appeals. Merchants therefore, are most effective when their stores follow out this thought.

Case studies were made among various merchants in "Survey Town" to get this information first-hand. Contractors who dramatize the merchant's lighting problem in this way have found the key to each store's direct, selfish interest. For merchants are not concerned in glassware, outlets, or wire. They are interested only in attracting customers and in making them want to buy.

Here is the way it has been worked out in some of the fine installations in "Survey Town." Study these cases and use this approach with your prospects.

STYLE TRENDS *in woman's wear make these shops prospects for the newest ideas in lighting effects.*

COLOR APPEAL, *the florist's chief stock in trade, must be the lighting man's cue to improve floral displays.*

Women's Wear

STYLE is emphasized more than anything else in a properly lighted woman's dress shop.

Style must be the keynote of the surroundings as well as of the goods sold. For the merchant must concern himself with the way in which customers appraise the store. Therefore, as styles change the lighting must change with them.

Refixturing of many merchandising establishments might occur only after 15 or 20 years. Changes in lighting styles are much more important in the dress shop than in many other stores. Five years' service by a lighting installation might be sufficient, especially if the old fixtures were purchased during a short-lived vogue. Even the best of installations after 10 years suffer in comparison with the newer jobs.

The contractor need not become a style expert, but he must keep his eyes open for trends. Technical improvements in light sources and fixtures are made year after year, which justify the scrapping of some existing equipment. He should check his suppliers regarding fixture styles, and have good knowledge of recent built-in installations. He can then be sure of himself and sell to the dress merchant on the basis of what is smart and best.

Flowers

COLOR is the florist's principal appeal to his customers.

Form and scent are important, but largely because they emphasize color. The contractor must therefore emphasize color in his discussion of lighting improvements.

The average florist's window is his main display area, except for wall cases and potted plant counters. Make sure that this main area has lighting that does not

Merchants like CURTIS *Recessed Lighting*

Round Shallow Unit

Square Shallow Unit

Round Deep Unit

Plain Recessed Unit

Hinged Rim Unit

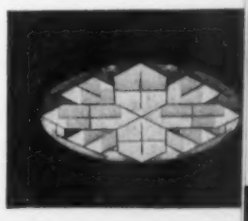
Flange Unit

Curtis Recessed Equipment and "Eye-Comfort" Luminaires Produce This Effective Lighting
Cook Paint & Varnish Co., Kansas City

CURTIS Recessed Lighting for stores is modern, effective, and economical. Curtis offers a wide selection of efficient recessing equipment, ready for shipment from stock and available through distributors everywhere.

Square and round units . . . entirely enclosed metal housed units . . . open-mounted unhoused units . . . deep units with X-Ray Reflectors . . . shallow units for recessing in limited space. Louvers . . . cover glass . . . plaster rings.

Curtis recessing equipment is easily installed insuring against unexpected costs that eat up the contractor's profit. Begin giving your customers new profit-building lighting with Curtis Recessed Equipment. A brand new 20 page catalog (Serial No. 817) is now available. Write for it today.

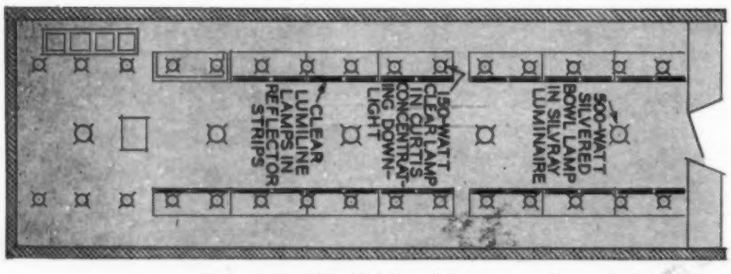


REPRESENTATIVES IN ALL PRINCIPAL CITIES . . .

Curtis Lighting

NEW YORK CHICAGO (1124 W. Jackson Blvd.) TORONTO

DECORATIVE CHARM *requires better grades of wall paper and paint to be displayed under good seeing conditions.*


CLEAR LUMILINE LAMPS IN REFLECTOR STRIPS
150-WATT CLEAR LAMP IN CURTIS CONCENTRATING DOWN-LIGHT
500-WATT SILVERED BOWL LAMP IN SILVRAY LUMINAIRE

HOW IT'S PLANNED *for lighting the store as shown below. Good lighting requires planned wiring as well.*

GLITTER AND SPARKLE, *the chief appeal of jewelry, brings into play the utmost in lighting technique.*

distort color. Low wattage sources, low illumination levels, tinted lamp bulbs and glassware, all give the flowers an artificial appearance. White and light colors look "yellowish" and somewhat faded. Greens and blues darken and seem almost devoid of life and color.

Use a spotlight to demonstrate quickly what a difference good lighting makes. The higher intensity and greater lamp bulb efficiency contrasts sharply with the poor illumination of the average shop. Such a trial may sell a complete spotlight installation. It can be duplicated to a satisfactory degree by a modern, general lighting system. It may even be exceeded by some of the newer methods, such as daylight fluorescent lamps. These lamps are ideal in the florist's refrigerator wall cases.

Paint and Wall Paper

DECORATION is the key of paint and wall paper stores.

The store selling such products needs lighting as a decorative as well as a seeing aid. Customers are more easily convinced of the importance of good decoration in store surroundings which generate confidence. The type, style and location of the lighting plays a big part.

A uniformly high level of illumination is needed. In thumbing through page after page of samples, the customer must be able to see immediately many little details that attract or repel in a design, while he is still in the store. Rolls of paper should be displayed vertically, just as the materials will be seen in the home. Samples should not be shown under the yellowish light of low-wattage lamps.

Color samples of exterior paint should have lighting closely approaching daylight. All painted surfaces weather and collect dirt, but the customer accepts the job when it is new and fresh. There should be no opportunity for doubting that colors are as chosen.

Jewelry

SPARKLE is the dominant appeal to those who shop for jewelry.

No one knows better than the jeweler the true value of glitter and sparkle. Few customers are even fair judges of value in precious metals or jewelry—they rely largely on the reputation of the store. But even the best of reputations must suffer if gold looks dull and uninteresting, if silver looks tarnished, if diamonds show yellow and red glints, if other gems lack brilliancy of color. Good lighting, correctly applied, is the answer.

Indirect lighting is soft, dignified, and restful for the jewelry store, as for any other surroundings. But it is not enough. Direct lighting of some form must be added. Sometimes it may be done by wall case and show case lighting alone, but more often combination fixtures or specially built-in units are required. Frequently, rich, dark woods are used for the store fixtures and wall finishes—the lighting must not overlook these. The more perfect the polish or silverware, the more it will look tarnished if it is displayed or viewed so that it reflects these dark areas.

Color matching units for small areas are helpful. With the many shades of finished gold and the many colors of jewels, it is an insurance against mistakes.

G-E FLUORESCENT MAZDA LAMPS PROVIDE NEW INDOOR DAYLIGHT

The new G-E Fluorescent MAZDA lamps offer electrical contractors, sign manufacturers, and hardware and electrical jobbers a brand new tool for profit opportunities wherever daylight effects or colored light sources are wanted. They give several times more light for the current consumed than filament lamps of the same wattage and color. For the same amount of light, they are 50% cooler. The daylight Fluorescent lamp offers the closest approach to real daylight ever produced at high efficiency. It offers great possibilities for stores, and factories where color discrimination is important. Available also in red, gold, pink, blue, green and white, they offer unusual profit opportunities for decorative lighting in specialty shops, theatres, etc.

The new G-E Fluorescent MAZDA lamps come in 18, 24, and 36-inch lengths and in 15, 20, and 30-watt sizes. Prices run from $1.50 to $2.10.

GENERAL ELECTRIC *presents*

2 REVOLUTIONARY NEW MAZDA LAMPS

G-E MAZDA PROJECTOR LAMPS ARE COMPLETE LIGHTING UNITS

G-E MAZDA Projector lamps combine a mirror reflector, a light-directing lens and a 150-watt filament in one hermetically sealed-in unit, protected from dust, moisture, and deterioration. Available in two types—*Spotlight type,* with a concentrating lens to supply a narrow beam of light, for stores, windows, factories, theatres, night clubs. *Floodlight type,* with a lens supplying a broader beam of light, for store windows and interiors, factories, outdoor lighting on signs, buildings, used-car lots, and other places.

• • •

General Electric also presents the 150-watt MAZDA Reflector lamp (see inset photo at lower right). With the same type of mirrored surface used on the Projector lamps, the Reflector lamp is made of ordinary glass, and will be of value wherever a smaller, lightweight lamp with a beam of less intensity is needed. Its use is also recommended where lower first cost is important. Price $1.10.

The new G-E MAZDA Projector lamps are made of heat-resisting glass, permitting outdoor use.

G-E MAZDA REFLECTOR LAMPS

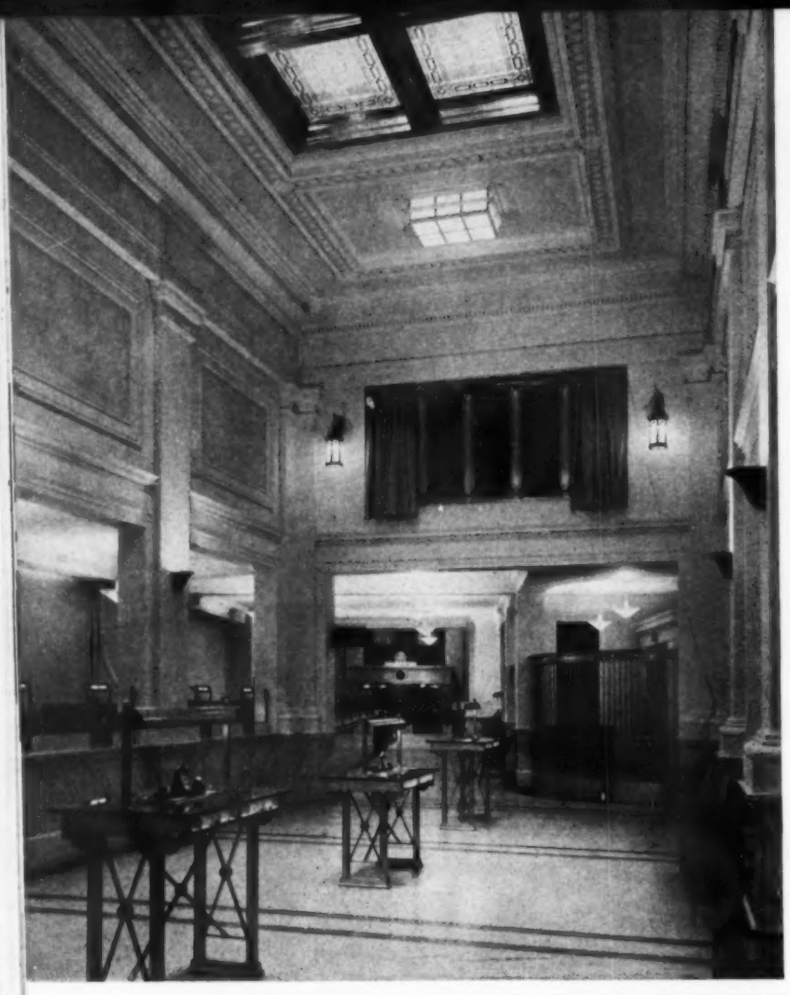
MAIL THIS COUPON FOR COMPLETE INFORMATION

General Electric Co., Dept. 166-EC, Nela Park, Cleveland, O.
Please send me complete information on:
A) G-E Fluorescent MAZDA lamps. ☐
B) G-E MAZDA Projector and Reflector lamps. ☐

Name.....

Company.....

Address.....



CUSTOMER IMPRESSIONS *impel banks to provide architectural lighting of dignity. Light is equally important for worker efficiency.*

FOOD BUYERS *shun bakeries which appear unclean. Light dispels dark corners that suggest dirt and vermin to customers.*

The Bank

DIGNITY should be the first impression upon customers entering a bank.

Certainly lighting fixtures can and do carry out this thought, in cooperation with the architecture. It is a very important factor in the bank's customer-appeal problem.

Refixturing in a bank is not a frequent occurrence. Too often the original fixtures are required by the design of the structure or are retained because of the bank's desire to create an atmosphere of permanency. But dignity in a bank cannot be maintained if mistakes creep into daily transactions, if eyestrain results in discourteous or uncheerful tellers. A bank must have illumination for good seeing.

Local lighting or special auxiliary lighting is usually the answer in the teller's cages, at the depositor's desks, and at other work spaces in the main banking area. Special auxiliary lighting might take the form of down lighting, built-on coves, directional plates, and similar methods which can be made to fit with the original architecture. Any one of these may give the contractor a bigger job than refixturing.

Private offices and non-public working spaces seldom have the limitations of the main banking area, and good seeing is just as important in them. Here the problems are similar to the usual office lighting job.

The Bakery

CLEANLINESS is king in the bakery.

All food stores cater to the sense of taste but each must play up this cleanliness appeal. White surroundings, of course, help in maintaining sanitary conditions, and good lighting does much to emphasize this atmosphere. Dark corners, which suggest dirt are banished by good light. Mixing and baking rooms are spotless and more inviting when well illuminated. The new sterilizing lamps prevent mold and bacteria, always annoying in the bake shop.

When pastel colors are used in the bakery to add a decorative note, or to identify a chain or cooperative group of stores, then lighting becomes of extra importance. Fixtures should be of simple lines—clean in appearance and easy to keep in that condition. Dim lighting and color may be romantic in a gypsy tea room but the combination has no place in modern merchandising.

Show windows in the bakery should not be treated as stepchildren. Bakery products, with the exception of breads and similar items, are not exactly necessities of life. A properly lighted window of colorful and attractive pies and cakes will do much to speed their sale.

Drug Stores

SPEED is what the drug store of today depends on.

Situated on a busy corner, the druggist must suggest his general wares in a moving picture style. Light must arrest the fast moving crowds.

A druggist is no longer merely a pharmacist. Much of his space and attention is devoted to cosmetics, toilet articles, packaged medicines and other general merchandise. His lighting must quickly move displays of these goods into sales.

Well lighted counters, illuminated show cases and direc-

THE UNSEEN HAND

NEW ASTRONOMIC DIAL TIME-SWITCH

Convenience de luxe for window lighting control is provided by this new, popular priced, Sangamo Astronomic Dial Time-Switch. Completely automatic, it requires no re-setting the year 'round.

that makes this installation <u>Completely</u> <u>Automatic</u>

Retail firms with stores all over the Nation have purchasing experts who thoroughly investigate the merits of the various equipment used in their stores. Most of these have long specified Sangamo Time-Switches. But *your* customers depend on *your* experience and *your* judgment for the right kind of time-switch. Give them a break by using the Unseen Hand!

SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

tional signs all aid in achieving the necessary speed. The quick-lunch counter or soda fountain must be inviting from a decorative viewpoint. It must also carry out the thought of cleanliness and rapid service.

The large globes of colored liquids, which identified the oldtime druggist, are of a day long since past. They are no longer needed to mark the modern pharmacist. The public knows that behind the many apparently unrelated products he displays dependable prescription service—when lighting displays the store in the tempo of today's speedy shopping.

Restaurants

COMFORT adds to the enjoyment of dining—so here is the major lighting appeal.

A restaurant relies more on repetition patronage than any other retail establishment. Naturally, then, patrons who enjoy good food in comfortable surroundings are sure to be repeaters. Good lighting will continue to emphasize this idea month after month.

This lighting may vary widely in type, but always should avoid awkward shadows or discomforting glare. The restaurant should choose fixtures different than those seen up and down the avenue in the grocery, hardware or general store. Suitable effects can be achieved by tinted glassware, indirect types of fixtures and others where the lamp bulbs are hidden. All enhance the beauty of an eating place.

Do not carry lighting to an extreme. The public likes natural surroundings. Do not distort the color of the food nor introduce other freak lighting.

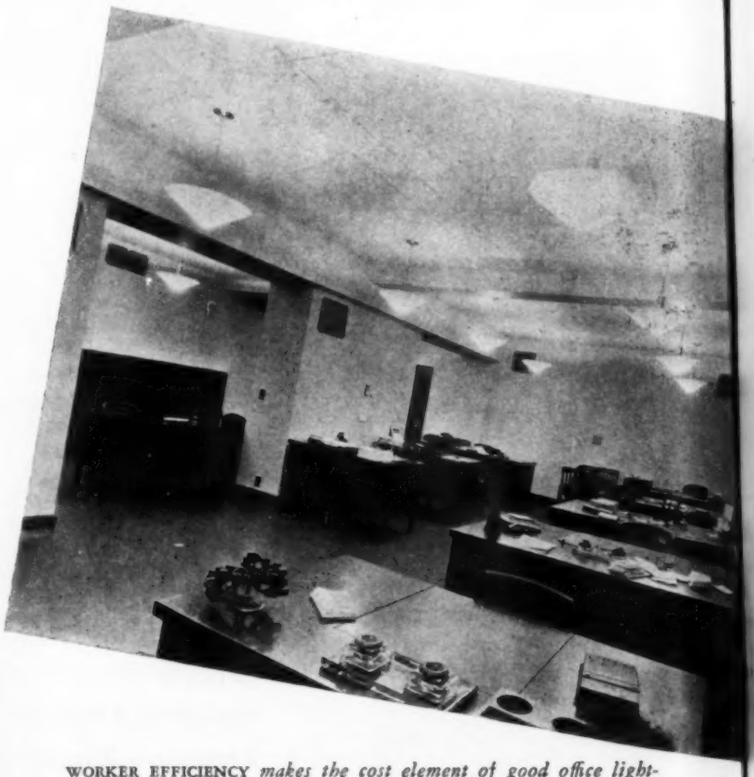
Where the restaurant combines a counter, the lighting should seemingly divide this area from the general table area. Where whitetopped tables are used to suggest quick meal service, the lighting may be more brillant and stronger than in those restaurants that appeal to a more leisurely diner.

Offices

EFFICIENCY is the main incentive for providing good light in every office.

Sunlight is of very little value in the typical downtown area where most offices are located. Even in buildings partially isolated, only those office workers near windows

QUICK SHOPPING *requires the drug store to light up its wares to arrest eyes instantly. Only high intensities will suffice.*



WORKER EFFICIENCY *makes the cost element of good office lighting trivial as compared to the direct results achieved.*

DINING COMFORT *requires eye comfort as well. Repeat trade means profit—correct lighting can pave the way to profits.*

2 New Luminaires FOR BIPOST LAMPS

The GB Luminaire, with patented Denax glass basin, is available in a 750-1000-watt size.

The MB Luminaire, with aluminum basin, is available in a 500-watt size and a 750-1000-watt size.

Designed for "Main Street" Commercial Applications

Here are two brand new Commercial Lighting units for your "Main Street" customers . . . modernly-styled luminaires at low initial and operating cost.

Specifically designed for the Medium Bipost Incandescent Lamps, the new units are the MB LUMINAIRE, with aluminum basin finished by the Alzak process, and the GB LUMINAIRE, with patented Denax glass basin.

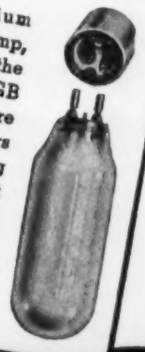
In MB and GB luminaires, Westinghouse has pioneered original luminaire designs to utilize effectively the new shape and the illumination characteristics of the Bipost Lamp. Both luminaires are equally effective for high or low ceiling heights. The choice between a metal or glass basin depends upon the decorative scheme as well as upon whether totally indirect or luminous indirect lighting is preferred.

Your local Westinghouse Jobber has complete details. Ask to see these units . . . check their construction features . . . see them in operation.

ASK FOR A SET OF GRAVURE PRINTS WITH CONSTRUCTION FEATURES, SPECIFICATIONS

Westinghouse Electric & Mfg. Co.
LIGHTING DIVISION
EDGEWATER PARK
CLEVELAND, OHIO

The Medium Bipost Lamp, for which the MB and GB Luminaires are designed, offers high lighting intensity at lower cost and greater maintained lighting efficiency.



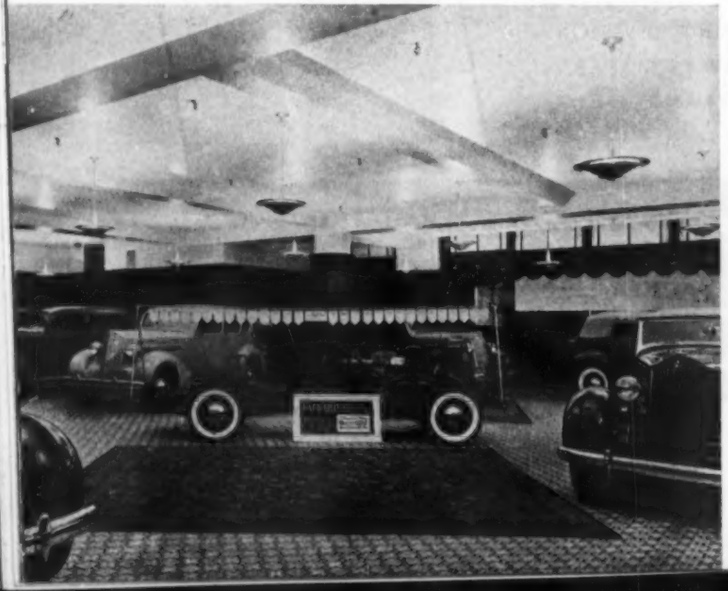
WHEN YOU THINK OF *Lighting Equipment* THINK OF

Westinghouse

QUICK ATTENTION *of speeding traffic gets motor servicing trade. Smart station operators use light generously, cash in at night-time.*

PERSONAL SELECTION, *a tradition in variety store merchandising, requires light that attracts the eye to many 5 and 25 cent items.*

MOTORDOM'S FINEST *is shown in huge windows. Lighting must provide night displays suited to critical evening auto shoppers.*



can benefit from sunlight regularly. And yet every clerk, stenographer or bookkeeper must see. Whether the premises are owned or rented, a poorly lighted office is a good prospect.

The initial call will probably suggest the best method of selling the job. Wages and hours are not the only factor in employee relations. Good will, health, efficiency, comfort—all are important. To the owner, good lighting is a way of keeping or gaining tenants; to the tenant, good-lighting should be a factor in signing the lease. On long-term leases the importance of efficient and satisfied workers should justify tenant-expenditures, or cooperation between owner and tenant.

Gas Service Stations

THE GASOLINE service station's problem is to stop the passing customer.

Casual pedestrains mean very little. Business must be plucked out of the traffic. Regular advertising methods can be used only in a general way. Prices are pretty uniform. Some other customer-attracting influence must be employed. Lighting has proved the most effective means of identifying the station and building sales. Nothing else can equal its speed in covering the distance between customer and pump.

Service stations operate late in the evening. Many stations do a major portion of their business during these dark hours. Good lighting makes the offer of service effective. The large lighted areas serve as an advertisement. But they must be bolstered by lighting which provides good seeing at the service pits. And the technique of gas station lighting has been well developed, as every contractor knows.

The car owner has learned that he need not tie his car up during business hours or on week-ends. He seeks dependable service at night. He goes where good lighting has created a favorable impression in his mind.

Automobile Show Rooms

DAY-LIKE displays provide the strongest appeal to night-time automobile buyers.

All car designers know that their product is viewed most critically under daytime seeing conditions. But it is when Mr. and Mrs. Public are free to shop around during the evening that they look the models over. The final purchase is based on the daytime appearance.

So the car in the showroom should be lighted to day time intensity. No one expects lighting sufficient to produce 1000 to 5000 foot-candles, full daytime values. But certainly a level of 20 to 50 foot-candles should not be considered out of place. The auto showroom is really an extended show window, its lighting should combine interior and show window systems. And since even the smaller stores down the street light their windows to several hundred foot-candles, the dealer who displays high priced automobiles is out of step with low levels of lighting.

Intensity alone is not sufficient. Poorly installed units will cause annoying glare from the bright finish of the car and kill its appearance. So a good showroom is worth the earnest study of the contractor and there is no lack of experience and equipment available to help him.

COMING

in

NOVEMBER

ELECTRICAL

CONTRACTING

INDUSTRIAL LIGHTING

We're taking care of your *industrial* lighting problems next month with a section crammed full of valuable facts that will help you sell and install better industrial lighting. With the theme "Industrial Lighting in Survey Town", this section will discuss the opportunities for improved lighting in the industries of a typical medium-sized city.

Watch for this issue and plan now to use it in your fall lighting activity.

LIGHTING EQUIPMENT MANUFACTURERS:

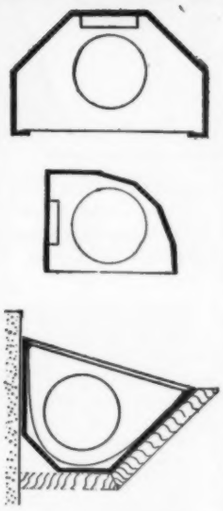
This lighting presentation offers an effective background for a sales message on your products. Ask for full details with complete listing of editorial content.

ELECTRICAL CONTRACTING
330 W. 42 ST., NEW YORK

KENT

for MODERN Commercial Lighting Equipment

CONSULT KENT



A few of the many KENT trough-light designs

Kent trough-light designs offer the last word in modern lighting, *plus* greater efficiency and lower light cost.

Kent lighting engineers will discuss your problems and make specific recommendations without cost or obligation.

KENT LIGHTING FOR—

- Mirror lighting
- Show Window
- Shelving
- Wall Display
- Counter
- Filing Cabinet
- Work Tables
- Mural Lighting
- Bar-room lighting
- Cove troughs (direct)
- Cove troughs (indirect)
- Suspended indirect lighting
- Suspended direct lighting
- Display cases
- Wall cases
- Silhouette signs
- Foot lights

KENT METAL MANUFACTURING COMPANY
20-22 MORTON ST. BROOKLYN, N. Y.

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OUT-DOOR LIGHTING FIXTURES

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Cast Iron or Bronze
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—Also Furnished in Cast Aluminum
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SEE THE

MULTI

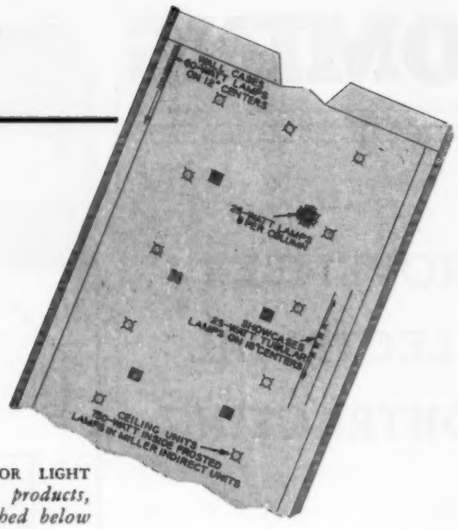
LOW INTENSITY LIGHT FIXTURES

See the Multi Low Intensity Light Fixtures in the new Multi catalog—for composing rooms, inspection tables, type racks, drawing rooms, jewelry assembly rooms — the line that really helps you build installation opportunities.

The NEW 88-page catalog will help you when ordering Lighting Equipment and Wiring Devices. It has a ready index which shows the different items, all plainly marked as to size, price, etc. It is yours for the asking — Send for your copy today!

MULTI ELECTRICAL MANUFACTURING CO.
1840 W. 14th St., Chicago, Ill.

NOVEL ATMOSPHERE *has an appeal in the cocktail lounge. A wide range of applications depend on the lighting man's ingenuity.*



PLANNING FOR LIGHT *to sell food products, as photographed below required this layout.*

Variety Stores

SHOPPING convenience is the principal appeal in the variety store of today.

People like to deal with merchants they know. But the chain store has overcome this preference by offering merchandise at sound prices and by making everything easy to buy. Lighting is one of its most effective tools. The main-stay of the variety store is stock priced from 5 to 50 cents. Such objects conveniently placed are well lighted so that the passing shopper is led to examine them. Much of this material is in packages or units easily handled. The lighting that encourages the customer to examine the package, makes more sales. That calls for ample light along all tables, counters and cases.

As variety stores become larger in size, directional signs are needed, in addition to general lighting. For a person shopping for just one thing does not represent profit to the dealer. It is the customer who wanders around and examines many things, who spells the difference between profit and loss. Comfortable, well directed lighting is required that harmonizes with the character and decorations of the store.

COMMUNITY MARKETERS *want bright, clean and comfortable surroundings. Chain markets are doing it so sell the independents.*

Bars and Cocktail Lounge

IN MODERN drinking places, lighting must provide novelty effects that lend distinction.

People seek relaxation and enjoyment in an atmosphere that is interesting and different, when they stop for a convivial hour. Light is one of the best mediums for creating recreational illusions.

Although high intensities are seldom desired, there is no reason for extremely dismal and gloomy surroundings. Lighting fixtures should be of unique forms rather than the average commercial types. And seldom should they be used alone. Small table lamps, novelty lighting around the bar, decorative lighting touches, here and there, are all needed for atmosphere. Fluorescent lamps with their many colors and low brightness, are suitable for such jobs.

This variety of equipment provides the contractor opportunity for extended wiring installations. Illustrations in current periodicals plus your observations offer the best guidance.

Food Stores

FOOD STORES strive to present cleanliness, convenience, visibility and comfort.

Their appeal is to a clientele whose visits are regular, but who tarry for short periods. An attractive interior, well lighted, is more important than special decorations, up-to-the-minute styling, and novelties.

Good general lighting of on average type is necessary. Efficient, practical fixtures that are easy to clean are most in favor. The small grocery or vegetable store has perhaps the least need of special forms of lighting. Large markets are aided by directional signs, special displays and bracket or floodlighting over counters. For butcher and delicatessen stores, show case lighting can strengthen the appeal of the goods.

The objection to lamp heat in refrigerated cases should be no bar to good lighting. Fluorescent tubular lamps, or the application of outside reflectors, overcome this barrier quite satisfactorily.

MAIN STREET—

A Year-Round Job

There are few towns in which Main Street is static. Stores change. Merchandising methods change. Lighting standards move steadily upward along the foot-candle scale. So it is a steady year-round job on any Main Street

IF you will follow this simple procedure, your time along Main Street can be well occupied for twelve months of every year. It all depends on your attitude, on keeping in touch with changes, trends, new ideas. That's what sells light to stores.

Pioneers in factory electrification looked for smoke-stacks and exhaust steam. Refrigerator salesmen look for ice cards in windows. There are also some definite signs to watch for if you want to find prospects for commercial lighting during every month of the year. Here they are—

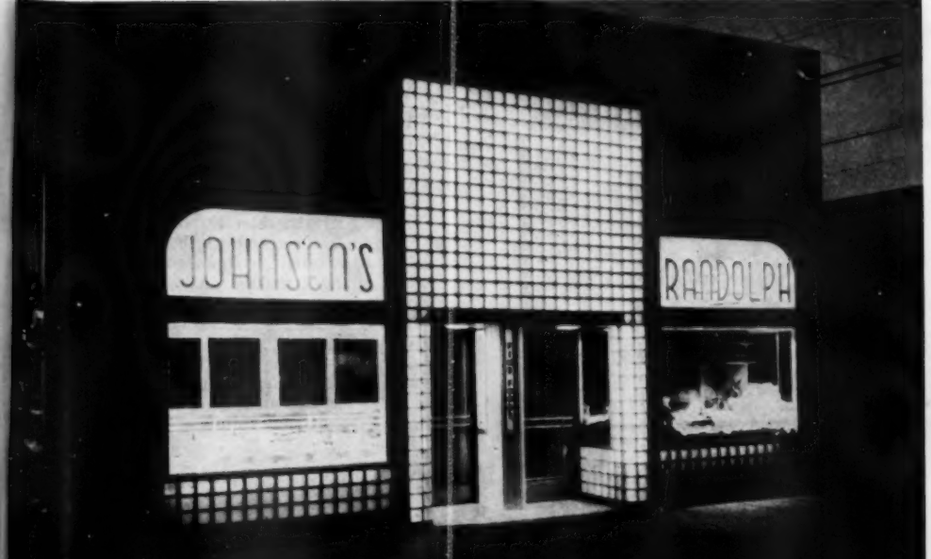
1. BUILDING CHANGES. Watch for new buildings or extensive alterations among the chain organizations and leading department stores. They set new standards of eye appeal and shopping comfort that can be used to arouse less modern neighbors. Every new model store area puts pressure upon competitors for customer good will.

2. TOWN IMPROVEMENTS. Has your Main Street had its face lifted? Is the street repaved? Have trolley tracks been removed? One city recently spent $1,000,000 to tear out trolley tracks and overhead wires, and to repave its Main Street. In eighteen months the city manager noticed an amazing improvement in illumination along six blocks of choice store frontage. Capitalize on these trends in your town.

3. NEWSPAPER ANNOUNCEMENTS. Watch your paper for announcements that store property is to be razed and replaced, or is to be completely renovated for some chain concern. Wide-awake storekeepers will often get busy, light up and paint up, to be ready ahead of this new de luxe competition. Plant this thought early in the game.

4. CHECK LEASES. Keep posted on new leases and building permits. A paint and wall paper store on the Main Street in "Survey Town" changed from 18,000 to 55,000 watts to be ahead of a new chain store in the next block. The salesman, who suggested "getting the jump," sold a 27-f.c. job and was praised for solving this merchant's problem.

EXTERIOR JOBS *are increasing for the alert contractor who submits good structural lighting ideas early in the planning stages.*

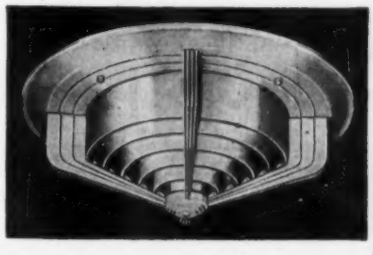


Right Down Your Street

- Drug Stores
- Grocery Stores
- Hardware Stores
- Florist Shops
- Department Stores
- Shoe Stores
- Variety Stores
- Bakery Shops
- Apparel Shops
- Candy Stores

Need the Plus Lighting Value of Sterling REFLECTORS

for show windows, coves and display cases, as well as the marvelous sales lighting of Ster-Lite Louver-Controlled Direct Lighting Fixtures for interiors.



Why not cash in on this powerful key to new wiring contracts? We'll help you. Just send data on prospective jobs for thoroughly modern layouts prepared for your special requirements by Sterling Engineers.

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Sterling
CATALOG

STERLING REFLECTOR CO.
1435 W Hubbard St CHICAGO

PROFITS in LIGHTING for YOU by using these 2 Valuable Sales Tools!

1. Lighting Creations

A factual booklet, showing "before and after" pictures of the benefits of modernized lighting, which you can use on commercial prospects as an "opening wedge" and effective "sales clincher."

2. Fashions in Lighting

A priceless aid in showing prospective and present home owners how Light Conditioning not only aids sight, but adds hospitable charm and glowing beauty to every room in their house.

• **These two manuals have been crammed with photographic illustrations—positive proof of the kind that is readily accepted—showing the advantages to be had from residential and commercial LIGHT-CONDITIONING. Just looking through these beautifully bound books will be a lot more convincing to prospects than any lengthy sales talk you could ever give them. Use them as "opening wedges" on *all* your prospects . . . take them along on all your service calls! They're designed to make your selling EASIER whenever there's a chance to close a profitable lighting job. If your wholesaler cannot supply you, we'll send you either one, or both. FREE! Detach, fill in and mail the coupon right now!**

START MAKING MORE MONEY....
by sending for these FREE sales aids TODAY!

THE ART METAL COMPANY—Cleveland, Ohio

Send me # 1 ☐ Send me # 2 ☐ Send me BOTH ☐

NAME .....

COMPANY .....

STREET .....

CITY ..... STATE EC-10

5. AROUSE COMPETITORS. A bang-up chain shoe store went in on Main Street, and in twelve months eight nearby merchants made alterations to keep pace. Back of it were two aggressive lighting specialists who planted the thought and cashed in.

6. PROPER TIMING. Pay close attention to announcements and construction progress. Be on the premises at the opportune time. Timing the job is up to you.

7. NIGHT SCOUTING. Find store prospects by scouting at night, as well as in daytime. The shortcomings of "cripple" windows are most apparent at night, for crowds gather only where merchants use the magic of good displays. Make foot-candle measurements in stores and at windows to prove below-par conditions.

8. CHECK UP VACANCIES. Vacant storerooms provide two good reasons for constant vigilance. First, you need to keep an eye on them for sudden occupancy, that may not have been announced otherwise. So you should have these vacant places spotted, and also recorded for what lighting is obviously needed whenever a new merchant moves in. Second, and equally important, size up those stores that are sandwiched between dark storerooms. They need especially attractive interior and display lighting to overcome the handicap of their darkened neighborhood. Unless this merchant lights up to a high-level, night shopping will angle across the street where more light pulls the eye.

9. SPOT OVERLOADS. Look for windows and interiors that are "overlamped." It is almost as easy to recognize over-lamped reflectors as to spot a fat man in a boy's hat. Tell your story of overloaded circuits, excessive voltage losses, and low light efficiency produced. It is the light specialist's job to explain these conditions.

10. TEMPORARY EQUIPMENT. Desperate merchants often tinker to get more light. Their experiments are conspicuous to any contractor and provide a sure-fire admission that experienced assistance is needed.

11. NEW EQUIPMENT. Keep tab on purchases of air conditioning, new store fixtures, elevators, tenant changes or renovating programs. If your approach is timed right, the owner is often open to an increase in his budget or a new loan to cover lighting modernization.

12. CLASSES OF PROSPECTS. Lighting prospects fall in two general classes. First, those who can be re-lighted properly without structural changes, requiring only a repaint job. The second general class needs some remodeling. Here the lighting specialist can often recommend worthwhile changes and be on the ground floor when it is all coordinated. Architects and builders often run amuck on lighting, so the smart salesman builds up his case with the owner. Consequently his ideas are more or less "musts" for the structural changes that follow.

ORGANIZED SELLING *brings in distinctive jobs like this. Once done, such unusual effects enhance your local reputation.*

CASH IN *on larger jobs of relighting and rewiring such as this one, by watching out for Main Street trends the year round.*

Organizing to Sell MAIN STREET

No contractor can get far on hit or miss methods. It is the systematic, all year work that brings results.

THE very word organize sounds like trouble, but it is really a simple matter. The thing to do is to follow the orderly procedure already recommended in these pages. In a word, if you want to develop a profitable store and office lighting business, go after it. Here's how—

The first step, of course, is to make an informal survey and make up a card list of the good prospects. Then schedule your calls so many each week. Before you call on each prospect, ask yourself these questions:

(1) How close are his nearest competitors?
(2) Is he more progressive, or less so?
(3) Have you a real lighting suggestion to offer?
(4) Can you recommend a particular fixture, and demonstrate it?
(5) Is your approach well timed seasonally?

But the good salesmen does not approach empty handed. Nor does he come over-burdened. He must be ready to demonstrate and prove his statements, so the contractor should carry with him:—

(1) A portfolio of illustrations.
(2) An illustration of the suggested fixture, or other recommendations.
(3) A foot-candle meter, except when the job is purely decorative or spectacular.

When you go in, tell your story from the customer's viewpoint. A merchant or office manager wants to know if anything is wrong with his present lighting. But you must talk his language. Avoid generalities. Be sure you know the specific problems you are trying to solve. Here are a few suggestions:

1. Compare his present conditions with neighboring stores, expressed in intensities.
2. Play up the key note appeal of each type of store.
3. Explain the benefits you can provide.
4. Outline the changes you find necessary.
5. Show, with pictures, what others have recently done.
6. Suggest demonstrations with trial equipment.
7. Present the cost in terms of monthly overhead, in percentage of his rent.
8. Compare operating costs with that of his old system.
9. Show testimonials on other recent installations.

After you call, jot on the card what happened and the outlook for business. Use some simple set of terms to classify these prospects — untouchables, no money, fair prospect, good prospect, survey desired.

Don't bunch your calls unduly. Try a few prospects scattered over a broad area. Even though several prospects are located in a particular neighborhood, it is often wise not to approach them simultaneously. Selling one good job among a group of stores will do far more toward breaking down sales resistance than door-to-door selling.

Above all else, don't try to do it all with your bare hands. Use all the equipment that will help. Check up frequently to see whether you are making full use of all the sales aids at your disposal. For example—

1. Pictures and clippings from lighting equipment manufacturers, and magazine articles.
2. Before-and-after photos of your own installations—your visual proof of being qualified to solve lighting problems.
3. Demonstration or trial equipment of all kinds.
4. Instruments to help you dramatize the need.
5. Lighting data for specific kinds of stores and for special conditions and designs.

And finally, do not hesitate to call in help when you need it. Don't go it alone. Others have an equal interest in the sale of good jobs in lighting. If you express a real interest in the opportunities awaiting you, various men in your town will be willing to give you the benefit of their experience. Their resources of knowledge, their keen interest in Main Street problems, can be put to work for you on your tough jobs. Here are the men to cultivate—

1. *Power Company Engineers*—Trained lighting experts ready to analyze lighting problems and help you prepare layouts for modernized illumination.
2. *Lamp Men*—Experts in various types of illuminants, where to use them and how to get the best results.
3. *Equipment Sales Engineers*—Specialists in their respective branches of illumination, and frequent callers, trying to be of help to you.
4. *Wholesalers' Lighting Salesmen*—Men who work on a wide variety of lighting problems daily. They know how to work out surveys and recommendations.

OAMCO REFLECTORS

MAKE MONEY ON TODAY'S WIRING DEMANDS . . .

★ Specify Glassteel Diffusers (threaded type shown above) on that next job. Ideal for Schools, Machine Shops, Laundries, and places where exacting operation is required. Steel porcelain enameled outside and in. Apertures on top allow light to reflect off ceiling—no contrasts. Pendent type with fitting tapped for ½" conduit or with cover for 4" outlet box. The OAMCO line will help you to do more and better jobs—Get details.

OVERBAGH & AYRES MFG. CO.
411 SO. CLINTON ST. CHICAGO, ILL.

RLM STANDARD DOME REFLECTOR
Conforms to specifications of RLM Standard Institute. 5 sizes—indoor and outdoor. Green outside —reflecting side white.

DOUBLE OPPORTUNITIES for SALES AND PROFIT SELLING AND INSTALLING

AUTOMATIC POULTRY TIME SWITCHES for LIGHTING POULTRY HOUSES

Cash in on this profitable market! Every poultry raiser now knows that ***LIGHTS INCREASE PRODUCTION AND PROFIT.*** They all want these Poultry Time Switches. Sell them! Install them! The season's short. ACT NOW!

FIVE MODELS
$4.95 to $18.00

With and without "Dimmer Circuit". All-electric and Manually-wound.

Write for Information

AUTOMATIC ELECTRIC MFG. CO.
MANKATO, MINNESOTA

—LIGHTING SELLS Wiring

Smart contractors find rich rewards in commercial lighting, because behind every installation of the lighting equipment waits the possibility of a profitable wiring job.

EVERY Main Street has prospects for two sales: lighting equipment and wiring. Lighting and wiring will go together, because new levels of illumination are not attainable when tight wires restrict the free use of greater wattage. But by the same token, the attempt to sell re-wiring on a basis of ample copper, more circuits, larger panelboards is pretty hopeless unless the customer is impressed with the need for more efficient illumination.

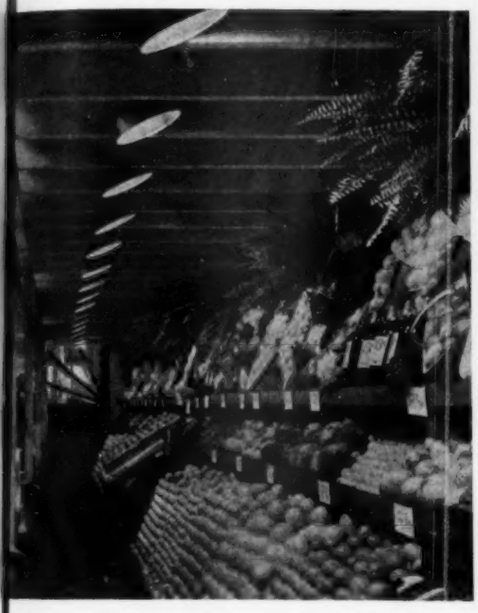
Properly presented, however, here's what lighting means in terms of wiring. Here are the normal wiring changes that may well follow as a result of good lighting salesmanship—

1. *Outlets* usually require rearrangement to give correct fixture spacings for proper light distribution.
2. *Switches* for local or group control are needed to replace unsightly pull cords.
3. *Circuits* seldom are ample. Old conductors have probably been overheated, insulation damaged. Circuit raceways are usually too small and are seldom routed to give the most desirable means of increased load distribution.
4. *Distribution Centers* need to be increased for the additional circuits required, furthermore the old panelboard equipment is apt to be of obsolete, exposed design. Steady overloads, tinkering and lack of maintenance, have probably caused fuse terminals, circuit switches and other current-carrying parts to become considerably abused.
5. *Controlling Means* for modern merchants call for time clock switches arranged according to varying store hours, and to throw the lights on or off during seasonal changes in night time window shopping traffic. Store controls often need re-arrangement to include variations in the display lighting layout.
6. *Feeders* are rarely of sufficient capacity to insure the delivery of proper voltage to larger fixtures, and to the new arrangement of outlets. Also the condition of feeder conductor insulation is apt to be below par, be-

TURN THE TABLES—*Lighting ideas bring wiring jobs, because nearly every lighting prospect offers a 10-point wiring market.*

cause of continuous use and the possibility of long exposure to heat.

7. *Services and Equipment* that have borne the brunt for many years in constant use usually show the result of no attention and of gradually increased loads.



WIRED FOR LIGHT *this vegetable display made a worthwhile job for the contractor. He sold results and got a wiring order. .*

8. *General Repairs* will be found necessary in the wiring system as a whole. Once you are on the job these conditions will be uncovered, and any fairminded merchant will welcome remedies for— grounded circuits, sockets and portable fixtures or appliances; frayed flexible cords; ailing motors and control equipment; faltering signal systems.

9. *Fixture Installation* work is becoming more and more a wiring contractor's responsibility. Witness the rapid trend to built-in reflectors, spots, coves, and on-the-job fabrication of trough or lumiline effects. A good example is the broad uses which will be found for fluorescent Mazda color and daylight effects. Likewise the lighting of luminous architectural effects, such as glass brick areas, composition column furring, sky lights, and artificial windows, calls for the utmost in artistic planning by the contractor.

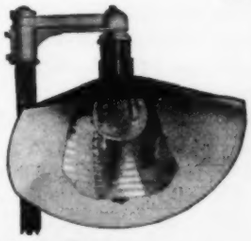
10. *Specialties* in lighting relate themselves directly to wiring of show cases, wall cases, silhouette letter effects and various forms of panel or outline lighting.

Here, then, are your wiring opportunities on Main Street. They all spring from your success in the sale of improved lighting. But because merchants are not at all interested in the wiring operations, you must interpret all these needs on the basis of light. More wiring jobs will be the result.

Look at it from
THE SATISFIED USER ANGLE TO BUILD *your* LIGHTING UNIT SALES

QUAD

IS YOUR ANSWER



Long Beam Floodlight

This complete line of Reflectors and Floodlights affords you full opportunity to meet all requests from your prospects for new and replacement lighting needs—indoor and outdoor—industrial and commercial. Depend on Quad—see your Wholesaler.

Duplex Dome Reflector

QUADRANGLE MFG. COMPANY
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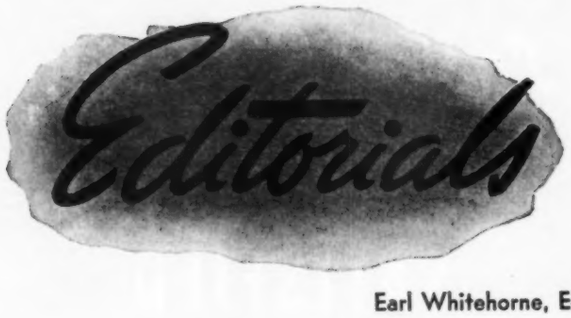


Earl Whitehorne, Editor

Special Permission Evils

The cussedness of some electrical jobs calls for unusual installation methods. Often that needs special permission from inspection authorities. Most inspectors are willing to play along with reliable contractors, and modify literal Code interpretations when they can.

Sometimes, however, "special permission" requests are made to gain a minor edge in costs. That's bad. It sets a dangerous precedent. Puts the inspector on the spot.

Obviously "special permission" should be given only for jobs where Code rules cannot be reasonably applied. The test should be—Could this special method be safely incorporated in the Code?

Code of Buying Ethics

NECA has evolved a Code of Buying Ethics. Ralph Walker's Fair Trading Policy Committee is sponsoring it and Georgia contractors are solidly behind it. Other contractors should study it and take it seriously.

A lot of men just don't spark on Codes of Ethics. They sound idealistic. But so is a town government. So is the state law. It is all an effort toward self discipline by groups. And there is no place where it is more needed by the contracting industry than in buying.

What NECA Members Do

Larry Davis, at the Detroit Convention, gave some interesting data. A recent survey of the business done by the 1300 members of NECA in 1937, he said, shows a gross volume of $135,950,000. This was 52 percent of estimated total volume of the entire electrical contracting industry last year. Of these 1300 members, 180 did over $200,000 volume in 1937, while 174 members grossed between $100,000 and $200,000, and 278 members grossed between $50,000 and $100,000. The average volume per NECA member in 1937 was $104,000.

Of this annual volume of these electrical contractors, 47 percent represents materials purchased, 29.5 percent covers labor employed, 2 per cent was inspection fees and job expenses, 17.5 percent went for operating costs and 4 percent was net profit. So these NECA members purchased $64,000,000 of materials, paid $40,000,000 to labor, $2,700,000 for inspection and job expenses, contributed $24,000,000 to their communities in rentals, salaries and community services, and took out $5,500,000 in profits. All this speaks well for NECA's representation in this industry.

Sick Industrial Wiring

Industrial wiring systems are suffering from excessive voltage drop and low power factor, Frank M. Hydon, Hydon Brand Co., Detroit, told the NECA convention. Voltage off 30 percent is not uncommon. Contractors fail to get the business waiting here because of poor selling methods, he says.

They do not contact the management sufficiently to sell the favorable fact that the contractors' men operate more efficiently, that only necessary materials are purchased, that their work is qualified by inspection. The contractor also has a wider range of experience and men available to do specialized work. He can relieve management of the fixed overhead of a plant department.

Coming from a man who is actively engaged in serving large industrials, this comment is pertinent. And most of Detroit's contracting work is done in active cooperation with the plant electrician.

Watch Polarized Light

Keep your weather-eye on the developments in polarized light. If you have noticed "polaroid" sun glasses in your opticians window, or "polaroid" filters for your camera, you have seen the first commercial appearance of a new substance that provides an entirely new method of controlling light. The use of this substance has recently hit closer to home in the form of a desk lamp which trims reflected glare off the paper you are reading.

These, however, are but straws in the wind. With "cold" light from the now familiar flourescent tube lamp, plus "light conditioning" by an adaptation of the polarizing technique, within a very few years, we may see a complete revolution in our methods of interior illumination.

Need for Apprentices

William F. Patterson, of the Federal Committee on Apprenticeships, told the NECA Convention that continued prosperity in the electrical construction field depends upon the solution of the apprenticeship problem, the training of new recruits.

This training, he says, should provide (1) a stated period of apprenticeship, (2) a definite schedule of required training and work experience, (3) supplementary instruction in schools, (4) an agreed scale of wages increasing as the apprentice advances, (5) continuity of instruction and work experience, (6) written agreements between employer and apprentice, (7) approval of agreements and standards by an impartial third party.

Walter Collins is striving to interest the industry in a constructive program. He deserves the support of all contractors. For this problem must be faced.

Business on the Highways

Every day or so comes another announcement concerning a new stretch of highway that has been lighted. New Jersey, for instance, has installed 220

miles of highway illumination in eight months. Soon the world's largest continuous stretch from Camden to Atlantic City will make night driving safer. That's progress. But it is disturbing to see so few contractors geared up to do highway lighting jobs.

Right now the trend among utilities is to ease off on construction responsibilities. So why don't more contractors do some checking up on this type of construction? There are many, many miles of highway yet to be lighted. In fact the job is just getting a start. Look at your road maps.

Can Contractors Get Appliance Profit?

Some contractors in Chicago believe the profits from appliance sales to be adequate incentive to sell re-wiring. Chicago has long been selling wiring to old homes and apartments. Selling costs ran high. The margin derived from outlets jobs has been far below the cost of soliciting. So the power company has run the show. Contractors have received the wiring orders through an arrangement with their association.

J. Norman Pierce, NECA's Executive Committeeman from Chicago, put the problem to the Detroit Convention following a talk by Henry Brite of EHFA on the government's Wiring Financing Plan. Mr. Pierce pointed out that appliance men are fooling the public into buying appliances they can't use for lack of adequate wiring. He maintains that appliances are not selling enough re-wiring. Contractors might do a better job to relieve tight wires if they might share in the sale of appliances for extra profit. Here is a new thought from a man of long experience.

Can We Swap On Adequacy?

The lighting fixture industry looks askance upon recent trends in specifications for adequate wiring. They wonder about deviations from national standards which allow ceiling outlets to be left out. New York City's A/W program proposes to follow a modified standard. In a word, a residence wiring installation in the New York City area will be certifiable although a seven-room home, for instance, falls seven outlets short of national standards. How about this from the wiring contractor's viewpoint? Fixture men believe that certain builders will quickly grasp this as a loophole to omit ceiling outlets.

What for the Farm?

One truly competent authority on the subject of wiring design recently stated that it was high time someone dug up more facts about farm electrical needs. Himself somewhat of a farmer in boyhood days, he cites the wide diversity of present-day farming.

Our friend cites some twenty kinds of farms which come in these four general groups—dairy and stock, poultry, fruits and vegetables, and grain. Now stock farms, he says, run to specialization under sub-groups such as horses, cattle, hogs, sheep and goats. The grain group raises wheat, corn, oats, barley, flax—some exclusively one kind. The fruit and vegetable group is equally broad, for instance—potatoes, table vegetables, apples, peaches, grapes, oranges, lemons, grapefruit. Then come the nut-raising groves—pecans, English walnuts. Oh yes, he mentioned tobacco, cotton, peanuts, beans, sugar beets, even the fur farms. Here is a big job for farm electrification.

What Is A Nipple?

Ever since electrical men evolved from the dairy business, they've been at odds about nipples—the ones used to interconnect steel cabinets, safety switches and other devices. Electrical inspectors have incurred the lasting disfavor of many a contractor over their interpretations of what is and should be passed as an approved conduit nipple. Now comes the Canadian Electrical Code with a definition for this step-child of the electrical system. Under Canadian Engineering Standards, this is a nipple: A straight piece of rigid steel conduit, not more than 2 ft. in length, threaded on each end."

Back Talk

Doesn't Like "Fix-It"

To the Editor—We have read your recent article "Come Out of the Shop". To be frank, we resent your method of referring to our electrical and mechanical service industry as the Fix-it business. We shall give you the benefit of all the doubts and grant that in our industry there are some that your appellation fits, in fact, using that term for some would be giving them a compliment.

Your reference to NISA is also noted with interest as the writer was one of the original supporters of this group and today is gratified with the progress made. In our membership today we have organizations that definitely are so far ahead of your Fix-it stage that it probably would surprise you. The writer hopes that in the near future you will give us a few articles covering the modern service shop.

Anthony J. Kaiser, General Electrical Specialty Company, Jamaica, N. Y.

If you had been at the last NISA meeting, you would not have felt aggrieved, Mr. Kaiser. The room was full of men who operate modern shops and they applauded and agreed. We were not belittling the modern successful shop, rather pointing out further opportunity that will come with more aggressive selling, a broader responsibility for solving the present problems of industry. We welcome your comment. We have been publishing numerous stories of modern shops, more are coming. Read them. We are not overlooking them.

Affecting Entire Industry

To the Editor—Thanks for the editorial "Behind the Beard" in the current issue of Electrical Contracting. I want to compliment you on the manner in which you have presented this very timely subject.

You have covered in a few words a very important matter which is affecting the entire electrical industry. I believe that your article will tend to awaken the industry to the necessity of correcting this situation at the earliest possible date.

Robt. W. McChesney,
Harry Alexander, Inc., Washington.

The prosperity of all electrical men depends upon the money they can make. Therefore, practices within the industry that destroy price levels and rob the contractor of his ability to make money are matters of industry concern.

Washington has courageously dealt with the situation through its Voluntary Code, that establishes competition on the sound foundation of quality and service. It will be a proud day for the industry when the responsible contractors of every city are working on this basis. Meanwhile, we should at least stamp out the immoral and uneconomic practice of granting wholesale discounts to those who do not perform the wholesale function.

He Has a System

To The Editor—Every electric contractor gets a share of bad accounts, that are a constant worry and play havoc with profits. I have a system of collectng that is sure fire. So far it has never failed, and is very easy.

After the customary billing, and time has passed, I make a personal call, to find out where the customer works, where he lives, who is his boss, or where he buys his supplies, I turn this information over to my wife, and tell her to "Give him the works".

She starts off by contacting him personally, by phone, at his home or where he works. Her line is to the effect that when accounts run longer than thirty days, it cuts into her allowance.

This usually brings the "next Tuesday promise", but next Tuesday, he is called again, bright and early, and any one answering the phone from the maid to the telephone operator in the outer office, gets the message to deliver to the "bad egg". This starts the "heat". You can nearly always get something on account, but in extreme cases a personal talk with the Boss, or wife gets results. No one seems to want his business cheating known at home.

You would think after such treatment, you would not get any more work from such people, but a lot call up for more. And usually I never have any more trouble.

R. McGiffin,
Canton, Ohio.

Now that's a smart idea—and a smart wife—which is a smart combination. In collections, the squeaking axle gets the grease, and it looks as though this is good squeaking.

WIRING Methods

ROUGHING FOR RECESSED FIXTURES

In wiring for flush type recessed fixtures, the rough wiring must often be concealed before the fixture boxes are available. Such was recently the case, when the Gary Electric Company of

LOOPED CABLES at header openings connect with boxes for flush fixtures, installed after ceilings are completed.

Hackensack, N. J., wired a new roadside inn. Here the ceilings were to be covered with decorative panels of insulating board. It was a rush job.

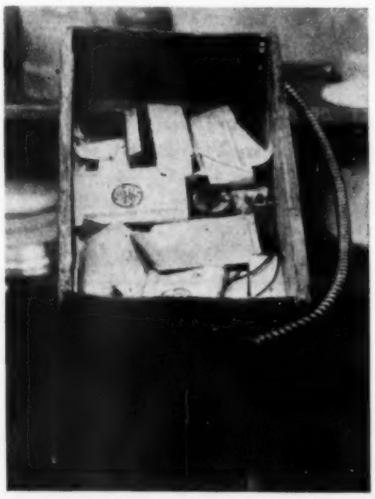
After spotting all fixture locations, wooden headers were framed in between ceiling joists to receive the metal cabinets. Armored cable circuits were then run to these locations, looped and left hanging out of the header opening. The fixture cabinets were later set into the openings, after armored cable loops had been cut and the loose ends connected into the cabinet knockouts.

WIRE YOUR HOBBY

"Help Yourself To a Hobby," was the unique approach to the subject of wiring recently contained in an ad sponsored by the electrical contractors of Richmond, Va. The promotion advocated a well-equipped home workshop, illuminated cases for collectors to display prized trophies, or a small motor and electric spray gun for doing a more finished job on old furniture. Interested readers were urged to ask the electrical contractors listed in the ad for the booklet: "Householders Digest of Adequate Wiring." Distributors were also contained in the listings. C. V. Williams, local contractor, was pictured in the "workshop" ad with a personal message for more wiring and more outlets.

TROUBLE BOX BUILDS CONFIDENCE

Schottler Electric Company, Emporia, Kansas, sends out a small "trouble box" with the men to all small wiring or repair jobs. It has done more than any other single thing to build customers' confidence. Outwardly it is just a small tool box, 18 by 10 by 12 inches deep. But inwardly it has what it takes to do all jobs, without the "return trip to the shop", so famous in commercial humor. But this trouble box has another value. They find that if the men are equipped to do additional rewiring, *right then*, customers will always say "Go ahead." "So we go prepared", says



JOB-SCARRED old trouble kit of fittings ready for repair emergencies.

M. W. Schottler, "to save labor outlay, and add sundry small jobs to the sales ticket by being ready. Women don't want to have to stay home waiting for an electrician, twice!"

Materials in the box average $18 to $20 in value, and include—

Contents of Tray

2 to 3 each of various types of sockets
sign receptacles
pull switch receptacles
snap switches, single and three-way
plug fuses, 6, 15, 20, 30 amp.
30 amp. and 60 amp. cartridge fuses
2 and 1-piece attachment plugs
rosettes

Contents of Main Box

12 foot roll of green lamp cord
25 feet of fixture wire
2 single pull tumbler wall switches
2 three-way tumbler wall switches
2 twin plug receptacles
1 old screw type receptacle and switch plates for each receptacle
odd key or keyless sockets
1 bell transformer
1 bell
1 buzzer
2 bell push buttons

On his return from a job, the trouble man immediately services his kit. Used materials are replaced, metered in and out, in yardage. Then he fills the original call ticket with a list of used materials, and stores the kit ready for the next call.

HINTS ON DRILLS AND DRILLING

If you use electric hammers, do not neglect your star drills. High grade star drills are forged in steel dies and hardened to give an average of 50 inches drilling in concrete, after which they should be re-dressed. Star drills are hardened only at the drilling point so that they will not snap off. Grinding the points removes the hardened metal. This leaves the drills too soft for good service. For that reason they should be redressed rather than ground or filed.

It is difficult to drill hollow clay or terra cotta tile without cracking it. A contractor in Pennsylvania, who uses a combination electric hammer and drill for hollow tile jobs offers a suggestion. "I sharpen star drills with very little lead on center, and have the edge at least 1/16-in. larger than the body of the drill. The hammer must be held perfectly straight, and is not allowed to sway, otherwise the wobbly drill will bind in the hole and crack the tile. I drilled over one hundred holes, and right on the edges, without any trouble." (Condensed from "Electric Tool Facts)

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ORANGEBURG NOCRETE *the new Dual Economy* CONDUIT

FOR USE UNDERGROUND WITHOUT CONCRETE ENCASEMENT

ORANGEBURG now offers a new non-metallic conduit combining the various characteristics required for use underground without concrete encasement; suggested for house connections, laterals and extensions, single, double and even triple duct runs; parkway lighting and suburban services; signal systems; substation yards and industrial or institution grounds.

SAVINGS IN MATERIAL COSTS

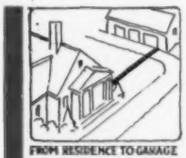
Orangeburg NOCRETE conduit is about *half the cost* of metal pipe and less than non-metallic conduits of any comparable quality. Ask our representative for prices. Extra couplings and all types of fittings, ells, bends, etc., are available.

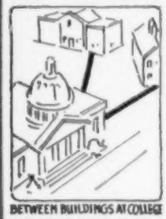
SAVINGS IN INSTALLATION COSTS

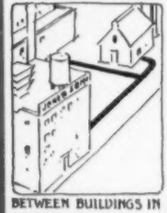
It "handles easy"; light in weight, in handy 5 or 8 foot lengths (in various sizes), this super-sturdy duct will surprise you by its adaptability. It assembles and installs easier, faster and at a lower cost than any conduit you have ever used. It is readily cut and fitted with ordinary wood-working tools.

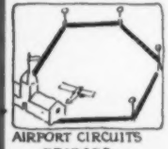
SERVICE AT TURN OF THE PHONE DIAL

Our sales offices are near you,—warehouses for prompt delivery within your district. Ask our representative for further information or phone us for prompt service.


FROM RESIDENCE TO GARAGE AND OTHER OUTBUILDINGS


BETWEEN BUILDINGS AT COLLEGE AND OTHER INSTITUTIONS


BETWEEN BUILDINGS IN INDUSTRIAL PLANTS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ORANGEBURG

THE FIBRE CONDUIT COMPANY

Sales Office: 292 Madison Ave., New York **Factory: Orangeburg, N. Y.**

Before the turn of the Century, this picture was taken of the Hubbell organization and the quarters which housed the company in its early days.

Today gge

A

HUBBELL

1888—1938

This aerial photograph of HARVEY HUBBELL, INC., factories and offices shows the development that has taken place during the Fifty Years since its start in 1888.

GRAYBAR

HAS BEEN SERVING

THE TRADE WITH HUBBELL PRODUCTS

FOR 50 YEARS

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ALF A CENTURY OF PROGRESS

IN THEIR DESIGN AND MANUFACTURE

FIFTY YEARS have wrought many changes in Industry. In 1888 manufacturing was carried on in comparatively small plants, and the equipment used would be considered almost primitive today.

In the intervening fifty years, we have witnessed a tremendous improvement in tools, equipment, materials and in the goods produced.

During these fifty years, there has been a continuous demand for devices and materials designed to effect convenience, economies, longer life and greater safety.

In stride with these fifty years of industrial progress, *Harvey Hubbell, Incorporated* has grown steadily on the site of its first "Machine Shop" in 1888 to the well-tooled, modernly equipped factory and offices shown here. Today, sales offices in Bridgeport, Chicago, San Francisco and New York; salesmen in every large city; and nation-wide distribution through the leading electrical wholesalers, are a testimony to these fifty years of business progress.

We like to believe that Hubbell Wiring Devices have played a real part in the modernization of electrical industrial methods and operations. We are equally proud of having furthered convenience and comfort in the use and application of electricity in our Nation's homes, institutions and public buildings.

On this occasion of our Fiftieth Anniversary we pledge ourselves anew to continue to manufacture electrical wiring devices designed and assembled with that high degree of engineering excellence and rugged construction characteristic of Hubbell products since 1888.

HARVEY HUBBELL, INC.

Harvey Hubbell
President.

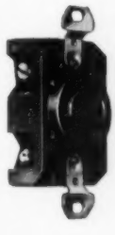
TYPICAL HUBBELL DEVELOPMENTS

PULL SOCKETS

TOGGLE SWITCHES

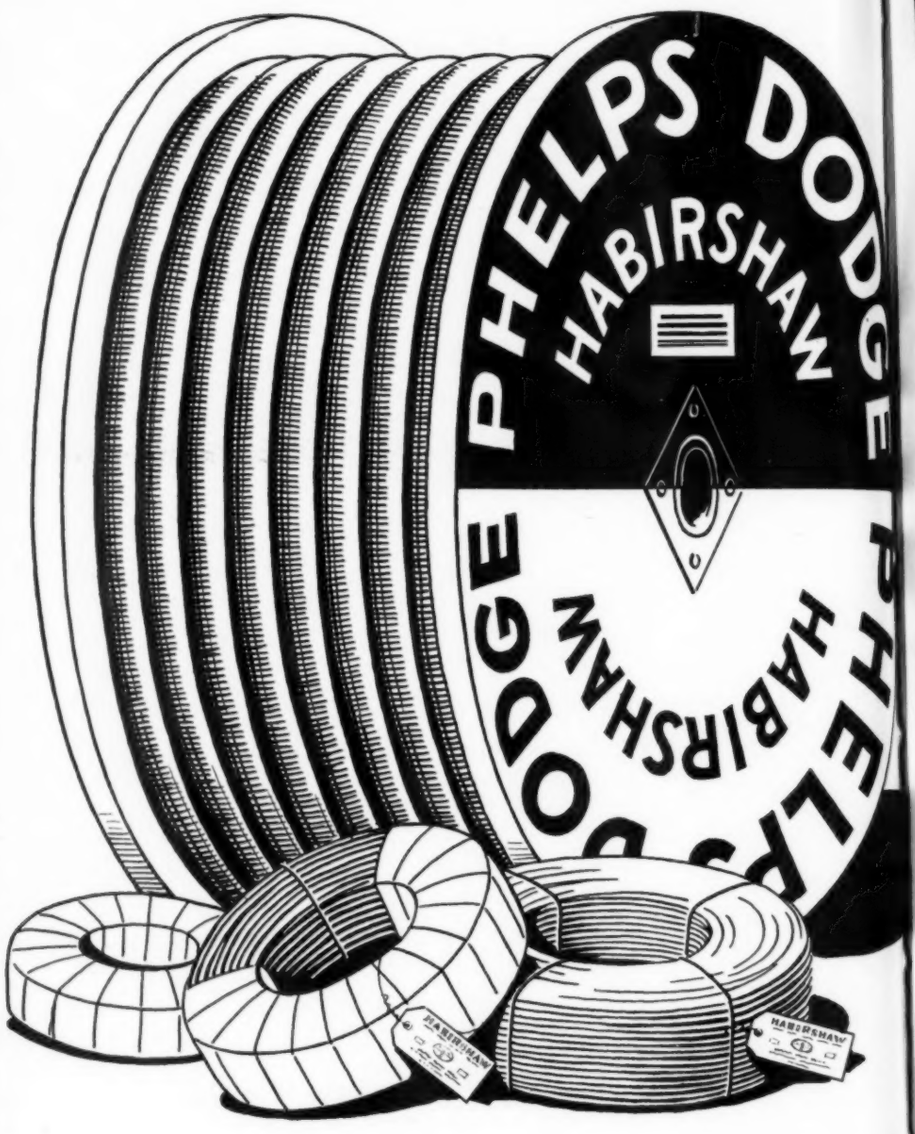
CONVENIENCE OUTLETS

NON-REVERSIBLE POLARIZED DEVICES


"TWIST-LOCK" RECEPTACLES and CONNECTORS

"HUBBELLOCK" CIRCUIT BREAKING DEVICES

Branches and Sales Representatives In All Principal Cities



HABIRSHAW, with its 52 years experience in the manufacturing of wires and cables has established a reputation for High Quality. Its leadership is based upon a record of performance.

HABIRSHAW

QUALITY WIRES AND CABLES

plus

GraybaR

Action Service

PHELPS DODGE COPPER PRODUCTS CORPORATION · P D · MINE TO MARKET

REG U S PAT OFF

HABIRSHAW
CABLE AND WIRE DIVISION

PHELPS DODGE COPPER PRODUCTS CORPORATION
General Sales Offices
40 WALL STREET, NEW YORK

Mills: BAYWAY, N. J. YONKERS, N. Y. FORT WAYNE, IND. LOS ANGELES, CAL.

P&S PASS & SEYMOUR Inc.

(Solvay Station) SYRACUSE, NEW YORK

Precision Made wiring devices . . . for Commercial, Residential, Industrial and Farm Jobs

Cat. No. 1391
Single Pole
(Residence Type)

THE P&S DESPARD LINE . . .

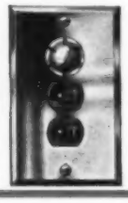
THE IDEAL LINE FOR RESIDENTIAL, INDUSTRIAL WIRING . . . *Write for folder.*

Here's the complete Flush Wiring System! An entirely practical and tried method of wiring device assembly into combinations of one gang—single gang box—one inexpensive one gang wall plate. Smart appearance, convenience, economy and profits all rolled into one!

All you need for assembly is a screw driver!

Cat. No. 1377
Combination
Flush Pilot Light

Cat. No. 1311-LT
Single Pole
Luminous Handle



Action Service from Graybar

Graybar Branches can supply this complete line of wiring devices and specialties . . . that means exactly the devices you want . . . at exactly the time you want them. You can depend on Graybar Action Service to keep your *job in action*—the best way to test it is to reach for your telephone, specify what you want, tell when you must have it,—and

BROWN-X, CHROME-X AND IVORY-X WALL PLATES

Cat. No. 1781-B

Cat. No. 1781-E

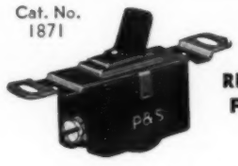
Cat. No. 1791-D

Cat. No. 1671-F

Cat. No. 1881-C

Cat. No. 1881-G

Cat. No. 1871



P & S RESIDENCE TYPE FLUSH TUMBLER SWITCHES

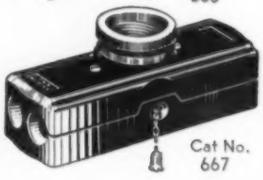
Designed for today's most active field—the residential market. Precision built mechanism — fewer moving parts — mechanically and electrically outstanding. Furnished in Brown Bakelite or Ivory to harmonize with New Process Metal Wall Plates.

. . AND THE *New Surfex Line* FOR SURFACE WIRING

Cat. No. 668

Cat. No. 666

Cat. No. 670



Cat No. 667

Corrosion-Proof, Shock-Proof—the complete line of SURFEX Devices for Surface Wiring. Will open up new wiring jobs for you. Install surface connections in half the time! No boxes, no connectors, no splicing, no soldering or taping! You just mount the base, run the connecting cable and install the cover. Saves one foot of cable at every outlet.

They are made of porcelain and all the essential parts, including box, cable clamps, grounding plate and solderless terminals are built complete into each device.

Cat. No. 660

Cat. No. 661

They install as a single unit and as all connections are made direct to the base of the device, cable loops are not required.

They give a neater looking job—a more modern appearance—which property owners everywhere like. That's why SURFEX is preferred in cottages, attics, basements, private garages, etc.

Either ARMORED or NON-METALLIC, sheathed cable may be used with SURFEX Wiring Devices. The cable clamps have been specially designed to accommodate both types.

Approved by Underwriters in every detail. A Surfex System saves you hours in installing and testing out, saves dollars in materials. Result: More profit to you—and more satisfaction to your customers.

GRAYBAR BRANCHES CAN SUPPLY THIS COMPLETE LINE OF WIRING DEVICES AND SPECIALTIES

PASS & SEYMOUR Inc.

NEW YORK

P&S

On a Complete Line of Wiring Devices and Specialties

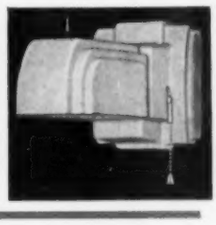
watch results. The completeness of this P & S Line is matched by the completeness of Graybar Action Service — the modern features of the line are matched by the modern "streamline deliveries" made possible by Graybar facilities and experience. All you need is a Catalog and a telephone to have your requirements satisfied. Try it!

ALABAX

Porcelain Lighting Fixtures

Outstanding in the line of Alabax Fixtures is the "convenience outlet" accommodating the Electric Dry Shaver so widely used by the travelling public . . . no wonder progressive hotel managers are installing Alabax . . . never change color . . . inexpensive . . . O.K.'d by Underwriters . . . last a lifetime.

SEND FOR ALABAX CATALOG AL-2

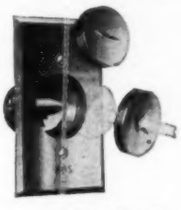


SPECIALTIES

Cat. No. 4521

WEATHERPROOF FLUSH SWITCHES With "T" Rating

P & S Weatherproof Switches are for installations exposed to weather dampness and special atmospheric conditions.



Cat. No. 1532

FLOOR OUTLETS

Eliminates the nuisance and danger of running wire leads across the floor furnished complete with two caps.

Cat. No. 1535

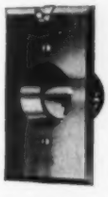
FAN HANGER OUTLETS

New Safety Design having hooks integral with strap to hook under edge of cover as an extra holding means.

Cat. No. 1533

OUTDOOR RECEPTACLES

A permanent, weatherproof convenience outlet for outdoor lighting connections or appliances.



Cat. No. 1534

CLOCK HANGER OUTLETS

A double service device, providing mechanical support for the clock and electrical connection.

Cat. No. 61317

Cat. No. O-PA

Cat. No. 1905

Cat. No. O-PW

Cat. No. O-47

PORCELAIN SOCKETS AND RECEPTACLES

Made in one-screw and two-screw types. Rated (Key & Pull) 250 watts, 250 volts—Keyless 600 watts, 250 volts. These sockets will meet every possible requirement of every job for which they can be used. See pages 48 to 52 of P&S Catalog No. 38.

Cat. No. 5464

BAKELITE PIN TYPE SOCKETS

Ideal for temporary decorative lighting work. Approved for either indoor or outdoor use. Sharp pointed pins pierce insulation and make positive contact. Wires are held in place by socket cap, which, makes a firm positive connection.
Sockets may be positioned or moved to any desired spacing at any time, as the pin contacts will not injure insulation of wire. May be used over and over again.
A detachable hook, supplied with each socket from tree or messenger wire.

Cat. No. 5026-2

PORCELAIN OUTLET BOX RECEPTACLES

ONE-PIECE — FLUSH BACK — SHADEHOLDER GROOVE

One-piece construction. Simplified mechanism is built-in, eliminating the necessity of removing the interior for wiring. Binding screws have large heads for easy wiring. Convenience outlet is connected internally, eliminating extra wires, soldering and taping.

Specification Type Flush Tumbler Switches With "T" Rating for Type "C" Lamp Loads

Cat. No. 3971

20 AMP. HIGH CAPACITY SWITCHES

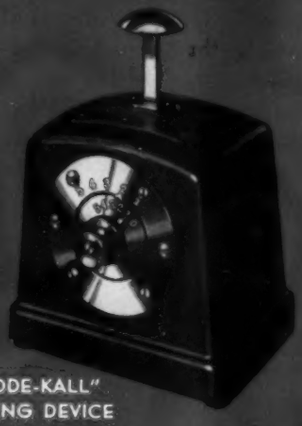
P & S 3971 type mechanism has arc-snuffer, Brown Bakelite handles. Variations supplied on special order. Double pole switches, for motor control, rated at 2 H.P., 115-230 Volts A.C., 125-250 Volts D.C. Double pole switch for appliance use, back connected, sealed with high heat compound — 2500 Watts, 125 Volts; 5000 Watts, 250 Volts.

GRAYBAR BRANCHES CAN SUPPLY THIS COMPLETE LINE OF WIRING DEVICES AND SPECIALTIES

HEADQUARTERS
FOR INDUSTRIAL SIGNAL EQUIPMENT

INDUSTRIAL SIREN

MOTOR DRIVEN SIGNAL



"KODE-KALL" CALLING DEVICE

HEAVY-DUTY WEATHER PROOF HOWLER

FACTORY NON-WEATHER PROOF HOWLER

SINGLE STROKE BELL AND CHIME

Whatever your signalling needs — from a complete factory paging system to a single horn—you are always sure of utmost satisfaction when you make Benjamin your "headquarters".

Benjamin signals are primarily industrial equipment, designed and built specifically to the rigid service requirements of the factory and shop. In every part is built the extra measure of quality that means trouble-free service, year in and year out.

And in the complete Benjamin line is a signal for every location—loud enough to pierce the din of a forge shop or attuned to the quiet of the modern office. Benjamin Electric Mfg. Company, Des Plaines, Illinois.

Distributed Exclusively Through Electrical Wholesalers

BENJAMIN
TRADE MARK

Distributed In Canada by Amalgamated Electric Corp. Limited

HEADQUARTERS
FOR INDUSTRIAL LIGHTING EQUIPMENT

"STOCK-BIN-LITE" REFLECTOR

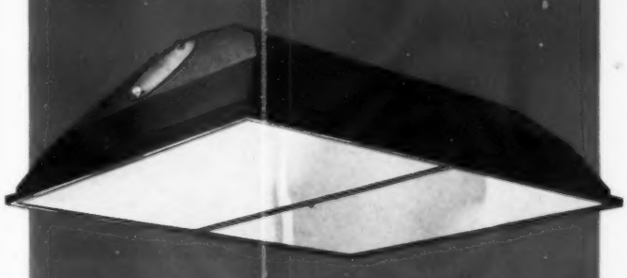
MERCURY COMBINATION DIFFUSER

"SILVERED-LAMP" DIFFUSER

"HINGED" DUST-TIGHT COVER

"FLOOR-SERVICE" TURNLOX GLASSTEEL

EXPLOSION-PROOF REFLECTOR



"SKYLIGHT" REFLECTOR

No matter what the lighting problem — no matter how exacting your requirements may be — there is in the Benjamin line a reflector or specialized lighting unit, designed in accordance with the most advanced illuminating engineering practice, that correctly meets your needs.

Typical of Benjamin leadership are the newest additions to the line illustrated here — new tools for seeing that help improve work standards and cut production costs.

When you think of lighting, think first of Benjamin. You are always sure of quality and lasting satisfaction at lighting "headquarters". Benjamin Electric Mfg. Company, Des Plaines, Ill.

Distributed Exclusively Through Electrical Wholesalers

BENJAMIN
TRADE MARK

Distributed In Canada by Amalgamated Electric Corp. Limited

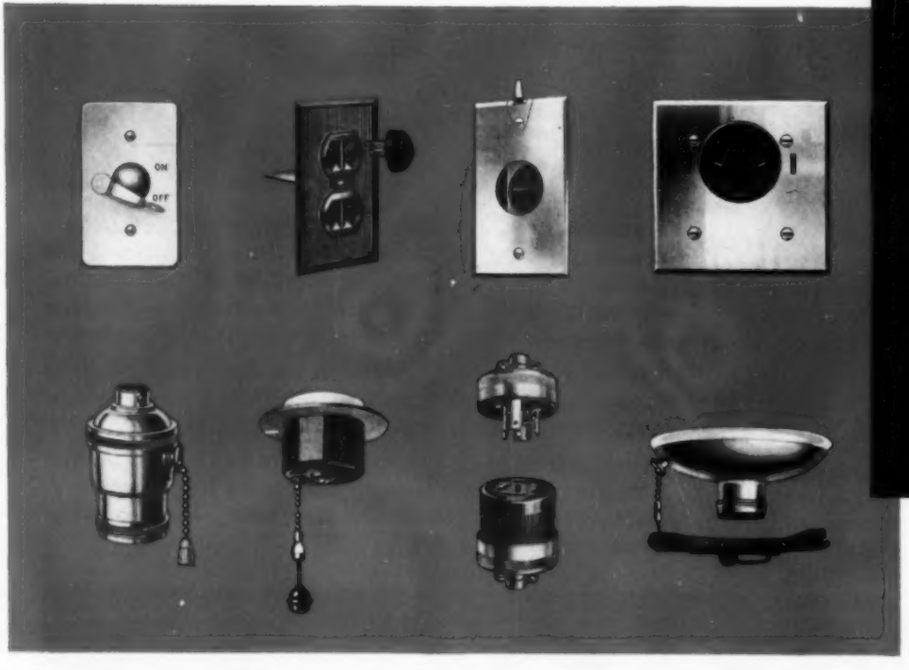
BRYANT

SUPERIOR WIRING DEVICES

WIRING DEVICES FOR EVERY ADEQUATE WIRING NEED

● **Bryant's fifty years' experience in manufacturing quality wiring devices . . . plus their equally long association with Graybar . . . provide a valued *Action Service* combination that meets your every wiring device need. Here you'll find a complete line . . . with complete stocks . . . and quality *always.***

GraybaR QUALITY — *Distributed and guaranteed by* GraybaR ELECTRIC COMPANY



EVERY OUTLET DESERVES A BRYANT DEVICE

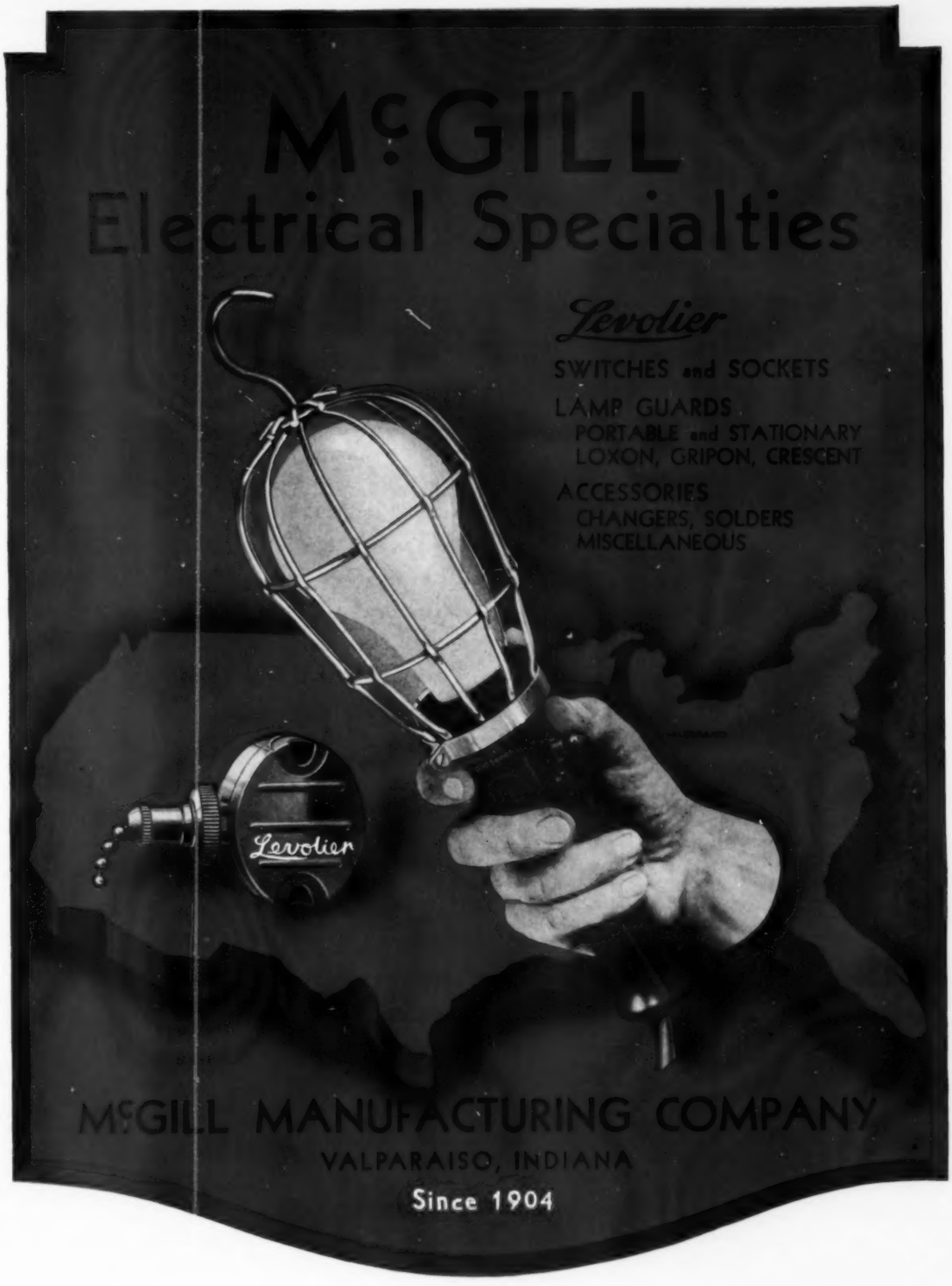
BRYANT SUPERIOR WIRING DEVICES 1888-1938 GOLDEN JUBILEE

50 YEARS OF PROGRESS DEPENDABILITY QUALITY

THE BRYANT ELECTRIC COMPANY • BRIDGEPORT, CONNECTICUT

NEW YORK: 101 Park Avenue · CHICAGO: 844 West Adams Street · SAN FRANCISCO: 325 Ninth Street

LOS ANGELES: 420 South San Pedro Street



McGILL products for years have been leaders in quality . . . both in material and craftsmanship. These products are made available to industry through an organization that likewise is a leader in both the quality of merchandise handled and in service . . . the Graybar Electric Company.

(McGILL Products are listed by Underwriters' Laboratories)

A job to be pr

AND A PROFITABLE JOB THAT AS

Many electrical contractors have adopted ELECTRUNITE Steeltubes for service entrance and range wiring — because, as they say:

"... why not give the customer the job I would choose for my own home."
"... it's neat and clean looking ... I can bend it where I want it."
"... outside services need mechanical protection."
"... the customer deserves a 'pull-in—pull-out' job for future changes."
"... Steeltubes makes a permanent finished job."
"... fewer straps necessary—and on brick homes this means something."
"... no waste on Steeltubes ... no waste of good wire either."
"... connections are dependable and water-tight."
"... Steeltubes doesn't have that 'temporary look'."
"... only one genuine Steeltubes—I know it's approved."
"... it costs little, if any, more ... sometimes the cost is less."

With ELECTRUNITE Steeltubes — the modern, low-cost raceway for wiring — you can provide the advantages of a rigid service at slight extra cost. You can provide a workmanlike job of which any mechanic would be proud. And you can offer an attractive, safe, sound and long-lasting job that appeals to home builders—and sells—especially so because it is the only wiring exposed to view in the modern home.

Knurled inside finish (Patent No. 1,962,876) available in ½", ¾" and 1" sizes

Steel and Tubes, Inc.

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND . . . . OHIO

SUBSIDIARY: REPUBLIC STEEL CORPORATION

ELECTRUNITE Steel

REG. U.S. PAT. OFF.

MORE THAN 175,000,000 FEET

...proud of ...

...ASY TO SELL

...or *Ask your jobber to give you figures on ELECTRUNITE Steeltubes . . . then use these lists to determine the cost comparison for yourself. You may be surprised at the little difference.*

	QUAN.	SIZE	DESCRIPTION	MATERIAL NET COST
STEELTUBES	37 ft.	1"	ELECTRUNITE Steeltubes	
	83 ft.	No. 6	Rubber covered wire	
	43 ft.	No. 6	Bare stranded wire	
	1	1"	Entrance cap	
	3	1"	Adapters	
	4	1"	Watertight box connectors	
	2	1"	Watertight couplings	
	1	1"	Entrance ell	
	6	1"	One-hole pipe straps	
	6		Screws	
			TOTAL MATERIAL COST	

	QUAN.	SIZE	DESCRIPTION	MATERIAL NET COST
CABLE	18 ft.	No. 6	3 Cond. arm. cable	
	24 ft.	No. 6	3 Cond. unarm. cable	
	1		Watertight cable cap	
	2	1"	Watertight cable connectors	
	3	¾"	Non-watertight connectors	
	15		Cable straps	
	15		Screws	
	1		Watertight wall plate	
			TOTAL MATERIAL COST	

The above lists of materials were compiled from records of 10,000 service entrance installations made by a leading utility company.

...ubes

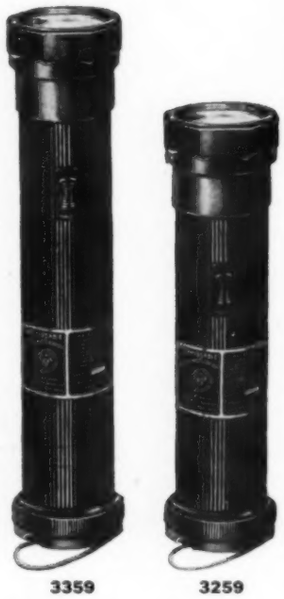
...STALLED!

UNDERWRITERS' LABORATORIES INSPECTED
ELECTRUNITE
REG. U.S. PAT. OFF.
RIGID
STEELTUBES-B
PAT. NOS. 1386434, 1435306, 1962876
N-57
ELECTRICAL METALLIC TUBING

LOOK FOR THIS LABEL FOUND ONLY ON GENUINE ELECTRUNITE STEELTUBES

These New
"EVEREADY" FLASHLIGHTS
MEET EVERY INDUSTRIAL NEED

for SAFETY in Gaseous Atmospheres

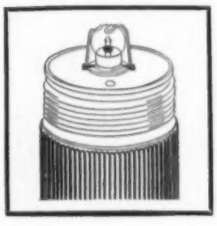


3359 3259

THESE new "Eveready" focusing spotlights for use in explosive, gaseous atmospheres bear the inspection labels of *both* the U. S. Bureau of Mines and the Underwriters' Laboratories. They are SAFE under the dangerous atmospheric conditions listed on the label.

These new "Eveready" Safety Flashlights are of high quality semi-hard rubber reinforced with brass, with unbreakable, plastic lenses, special protected lamp and hand-replaceable, heavy-duty slide switch with positive "off" and "on" positions. Hexagonal heads prevent rolling, ring-hangers add to convenience.

"Eveready" Safety Flashlights resist water, oils, greases, gasoline, alcohol, acids, alkali, are non-conducting and proof against impact and dropping.



Guard wire holds lamp in spring-loaded socket. Should bulb break, spring ejects lamp-base, instantly opening electric circuit and thrusting hot filament against chilling guard wire.

2 New FLASHLIGHTS are WATERPROOF

3354 3254

The new WATERPROOF Flashlights, 3354 and 3254, are *completely covered,* switch-and-all, with a soft rubber sleeve. Unbreakable lenses, chrome plated reflectors. Proof against hot wires, acids, gasoline, oil, alcohol, greases and dirt.

3 more New Flashlights for Industry

3351 3251 3258

The two- and three-cell general purpose Industrial Flashlights, 3251 and 3351, have unbreakable lenses, hand-replaceable slide switches and are cased in semi-hard rubber. Safe with "hot stuff." Unaffected by water, oil, gasoline, alcohol, acids or dropping impact. No. 3258, the new Flexible Extension Flashlight, answers the demand for a safe light for inspecting moving machinery, drums, barrels, telephone equipment and hard-to-get-at spots.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide UCC *and Carbon Corporation*
General Offices: New York, N. Y. • *Branches:* Chicago, San Francisco
The word "Eveready" is the trade-mark of National Carbon Co., Inc.

WEBSTER ELECTRIC

Teletalk

REG. U.S. PAT. OFFICE

Distributed and guaranteed by Graybar Electric Company

Split-Second

Inter-Communication

A New Source of Product Wiring and Service Profit

● Electronic inter-communication is accepted by business, industry and non-commercial institutions—and Teletalk is the accepted product to sell this wide and profitable market. . . . It is now being used by every type and size of business in every state and in fifty-two foreign countries. . . . Illustrated on this page you will find the complete Teletalk line. The number of units which can be incorporated in one system is unlimited, yet a two station sells at a surprisingly low price. The installation represents a labor and material sale for you. . . . There is a three-way profit in Teletalk—and we supply you with sales helps, service manuals, proposal forms, and complete catalogs. . . . Write for all the details of how you can capitalize on this new market.

WEBSTER ELECTRIC COMPANY, RACINE, WISCONSIN, U. S. A.
ESTABLISHED 1909
Export Dept.: 100 Varick Street, New York City
Cable Address "ARLAB" New York

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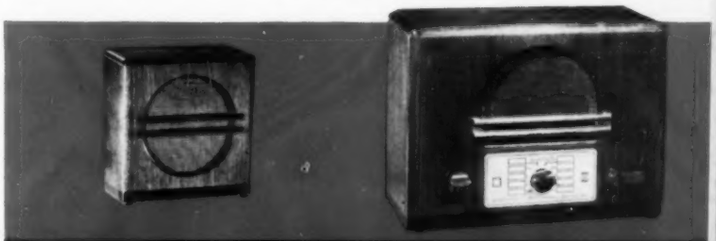


MODEL 5A-45 Speaker-Microphone for use where calls need not be originated or where paging only is required.

MODEL 110 is a ten station unit similar in detail to the Model 105 and can be used with all other models of Teletalk.

MODEL 10B-45 Speaker-Microphone is a high power unit similar to the model 5A-45. It is for use where large space is to be covered.

MODEL 105 is a five station unit which is built in three series and can be used in combination with all other models.

MODEL 224 is the same as Model 212 with the exception that it can handle up to twenty-four stations.

MODEL 212 is a de luxe Teletalk which possesses advanced features not found in the model 105 or 110. It has a capacity of twelve stations.

MODEL 212-A is similar to the Model 212 except that it incorporates an annunciator and buzzer system. It has a capacity of twelve stations.

Webster Electric

"Where Quality is a Responsibility and Fair Dealing an Obligation"

TIME-PROVEN RELIABILITY

Luminous Tube Transformers

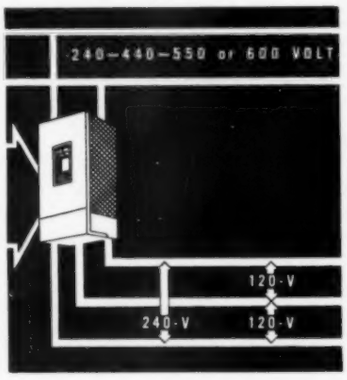
For Signs and Spectaculars

All Jefferson Transformers (above 5000 volt secondary) for luminous tube signs incorporate the midpoint grounded, balanced design principle—pioneered by Jefferson and largely responsible for the present efficiency and popularity of luminous tube signs. Made in types for every need, for indoor and outdoor service—all designed especially for their purpose.

For Interior Illumination and Decoration Systems

To improve the present use of the highly efficient fluorescent luminous tubing for interior illumination and decoration, Jefferson has added the Series 727 Transformers particularly suited for this service. These Transformers may be mounted recessed in wall, ceiling or post, or installed on the surface. High tension cables are eliminated, electrode housings are recessed and connections to the primary are quickly made by means of convenient screw terminals. There are knockouts for conduit entrance and adjustable brackets for either surface or recessed mounting. When recessed, flush plates are available.

Power Circuit Transformers



Instead of distributing both low voltage (110-120) circuits and high voltage power circuits with their duplication of conduits and wiring—present practice in industrial plants is to distribute only the higher voltage current. This saves installation expense, cuts line losses—and cuts electric bills by reason of lower Kwh rate.
For lighting, fans, small electric tools and appliances, Jefferson

Three of 31 Jeffersons in this plant.

Power Circuit Transformers are installed wherever required. They are air-cooled, present no fire hazard—and may be mounted on wall, post, or floor.

Jefferson-Union Renewable Fuses

For over 40 years Union Fuses have established their worth—simple, rugged, easily renewable, Jefferson-Union Renewable Fuses should be in your stock in all standard capacities.

Jefferson Fustats

A combination fuse with thermal cutout—resists tampering and stops over-fusing. Thermal cutout provides a long time lag and prevents blowing needlessly on harmless motor starting loads. Stops over-fusing because 20 or 30-ampere Fustats will not fit into a 15-ampere adapter. Similar limitations apply to all sizes. Available up to 30 amperes.

JEFFERSON ELECTRIC COMPANY

BELLWOOD (Suburb of Chicago) ILLINOIS

Canadian Factory: 535 College St., Toronto, Ontario

JEFFERSON ELECTRIC PRODUCTS

HERE'S A "4 STAR" MERGER . . .

STARRING THESE FOUR FAMOUS PERFORMERS

THAT WILL SHOW CONTRACTORS NEW *Profit Possibilities!*

SCHWARZE

FARADAY

PR

ECLIPSE

DEVEAU

★ *The most complete line of signaling equipment available from any one source.*

★ *Broader service facilities on signaling systems, as well as signal devices.*

★ *Combined engineering skill — of the personnel responsible for the high quality of the products bearing these well-known trade marks — directed toward constant product improvement.*

★ *Assistance by sales engineers qualified to help you with any signaling problem.*

The acquisition of the *Stanley & Patterson Company* by the *Schwarze Electric Company* — individually known for the quality and completeness of their lines of electric signal devices and systems — offers electrical contractors the very certain advantages outlined above. If you are not now using either *Schwarze* or *Stanley & Patterson* equipment, we urge you to investigate immediately the added profit possibilities which this combining of "*four famous trademarks*" opens to *you!*

STANLEY & PATTERSON
DIVISION OF
SCHWARZE ELECTRIC COMPANY
Adrian Michigan

Contractors! RELY ON SHERMAN
FOR MODERN JOBS AT LOWER COST

WEDGE-GRIP CONNECTORS

For service entrance and all small wire connections. Strong, safe, solderless. Tough bronze screw can't come out—weather- and rust-proof. Four sizes cover a wide range of wire capacity. Get Bulletin No. 22.

SPLIT TINNED SPLICING SLEEVES

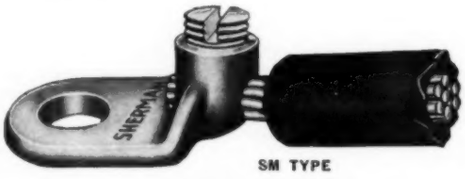
A complete range of sizes covers all underground cable splicing requirements. Pure copper—smoothly tinned—correctly annealed. Get Bulletin No. 20.

SET SCREW CONNECTORS

Solid brass—all screws rustproofed. Number plainly stamped on each connector. Made with both dividing wall and hole clear through. Bulletin No. 8.

SOLDERING LUGS

A complete line of all types including side-formed, two-hole center-formed, angle, and heavy duty. Send for Bulletins No. 6—21—17.



SM TYPE

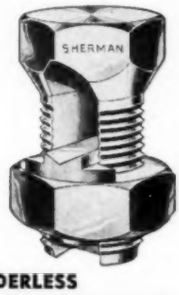
SO TYPE

SOLDERLESS LUGS

—Rigid assembly. No loose parts. Interchangeable with Soldering Lugs of standard design. No special tools required. Send for Bulletin No. 15.

RIGID GROUND FITTINGS

A complete line made of rust-proofed heavy malleable iron, covers all grounding and bonding requirements. Strap type, pure copper ground clamp can also be furnished—solder or solderless. Get Bulletins No. 12 and No. 11.



SOLDERLESS SERVICE CONNECTORS

For primary, secondary service, or transpormer solderless line taps. Tough bronze in every part—no sharp edges—tight contact. Insured low resistance, anti-radio interference joints. Bulletin No. 22.

BRONZE

BAKELITE

CONNECTORS
(Brass and Bakelite)

Make truly safe "Pigtail" joints. Mechanically strong—electrically safe. Only one size needed. Send for samples and Bulletin No. 10.

Two handy devices for connecting all small joints. The Bakelite Connector requires no insulating—makes a truly safe "pigtail" joint. The Bronze Connector makes butt-end wire connections. The screw cannot come out. Send for samples and Bulletins No. 10 and No. 18.

LEFT—FIGURE EIGHT DOUBLE TUBE

Seamless—free from burrs. Correct temper. High grade copper tubing.

RIGHT—OVAL SINGLE TUBE

High grade copper tubing. Carefully grooved to prevent bucking outward when twisted.

SPLICING SLEEVES

Both of these dependable Splicing Sleeves are popular for all overhead line work. Will handle all types of wire, including Copperweld. Send for Bulletins No. 20 and No. 23.

SHERMAN Manufacturing Company products have been relied on for 35 years by Contractors from Maine to California.

The Sherman Line of Electrical Products is practical and dependable. Sherman products are designed and manufactured under rigid supervision to insure proper electrical and mechanical performance Extensive stocks available for prompt shipment. Specify "Sherman" for your requirements.

H. B. SHERMAN MFG. CO. BATTLE CREEK, MICH.

. . . . . "We Switched to BUSS *Super Lag* FUSES"

. . . "We reduced our Fuse Blows 92%"
A. E. Shorten, Chief Electrician, John T. Lewis Co., Philadelphia, Pa.

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R. Monroe, Chief Electrician, American Brake Shoe & Foundry Co. Mahwah, N. J.

. . . "We saved a re-wiring job for a Richmond High School."
Morris Hunter, Electrcial Contractor, Richmond, Va.

. . . "We stopped paying a shutdown tax on our 15 h.p. lathe."
Carl Boyer, Electrical Engineer, Jacobs Aircraft Engine Co., Pottstown, Pa.

WHY BUSS FUSES DON'T BLOW NEEDLESSLY

10 FEATURES in the design of the FUSE-CASE help make it possible..

The SUPER-LAG development in the FUSE-LINK completes the job.

GET THE FACTS: Behind this evidence are basic reasons why BUSS Super-Lag Fuses don't blow needlessly . . . and after all, since we are dealing with money-waste isn't it a matter well worth executive investigation to determine just how senseless and unnecessary shutdowns can be eliminated — just how fuses can be made to protect — but not blow needlessly — just how others have profited handsomely by switching to BUSS Super-Lag Fuses. Send for a free copy of the Rb book on Fuses.

Bussmann Mfg. Co., University at Jefferson, St. Louis
Division McGraw Electric Company

BUSS *Super Lag* FUSES

Action Service

GENERAL CABLE

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A STANDARD OF QUALITY FOR OVER HALF A CENTURY

WIRES, CABLES

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for Customer Satisfaction
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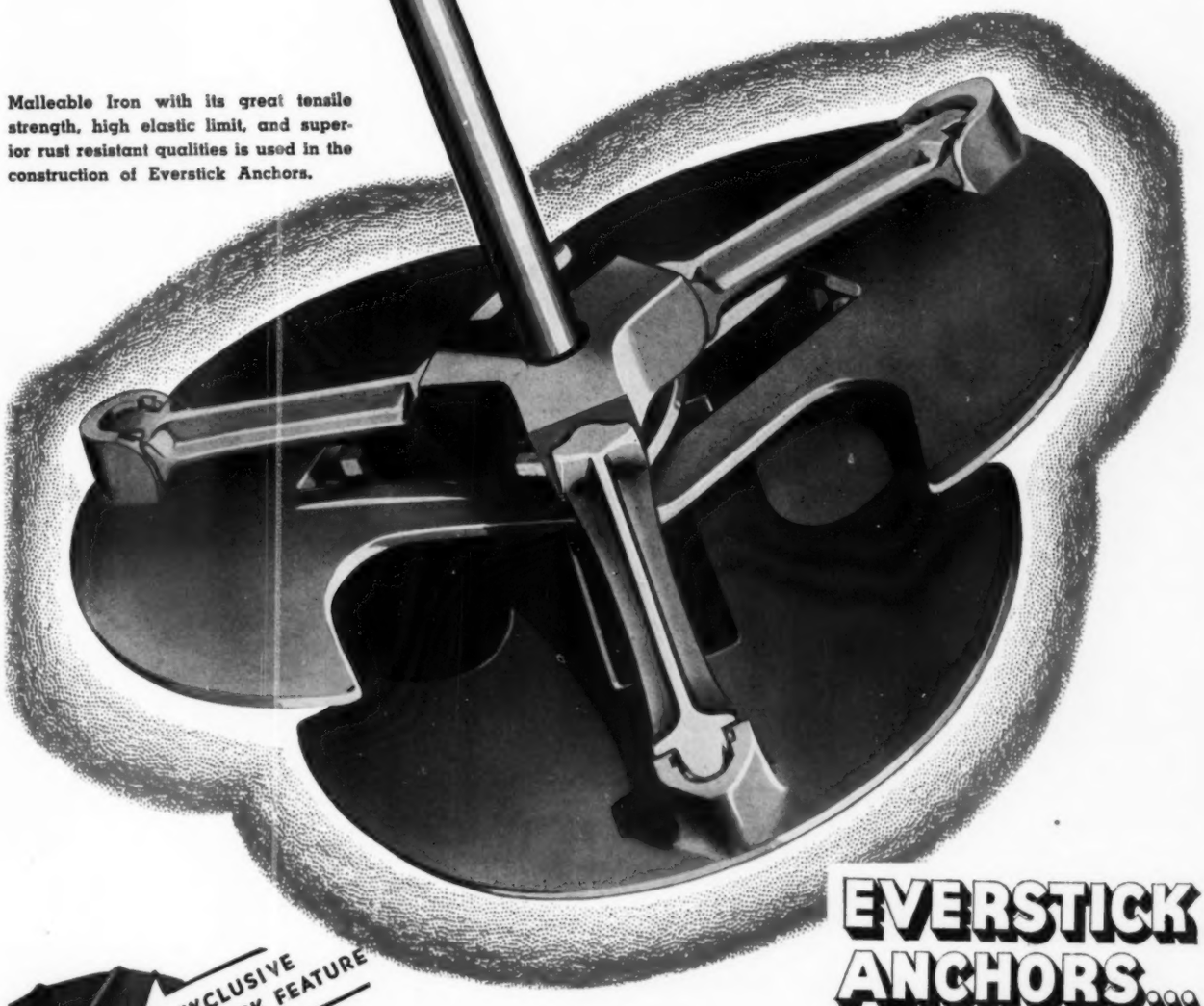
HOLDING POWER PLUS LONG LIFE!

Engineers and crews LIKE the Everstick Anchor . . . . LIKE its ease of installation which means speed and economy in maintenance and construction . . . . LIKE its PROVEN HOLDING POWER . . . . proven on the toughest jobs. Everstick's record of permanence, strength and safety is your assurance of complete satisfaction.

Malleable Iron with its great tensile strength, high elastic limit, and superior rust resistant qualities is used in the construction of Everstick Anchors.



EVERSTICK ANCHORS...

New Nut Housing locks Anchor firmly on rod. Rod cannot slip through Anchor when being installed.

Everstick Anchors are available in 2-way, 3-way, 4-way and cone types in 15 sizes . . . . suited to all strain requirements. Used and preferred by leading utilities everywhere.

EVERSTICK ANCHOR COMPANY
FAIRFIELD, IOWA

TRUMBULL

CONTRACTOR'S CHOICE

Fuse Puller Switches

Trumbull Products are DESIGNED to give the contractor every advantage in ease and simplicity of installation . . . to assure finished jobs of which he can be proud and confident.

They're BUILT to guarantee his customers long and faultless performance.

They're DISTRIBUTED through wholesalers who can assure him the utmost in prompt efficient service.

And they're CATALOGUED in the new "TRUMBULLIST" for his most convenient selection from COMPLETE LINES for every requirement.

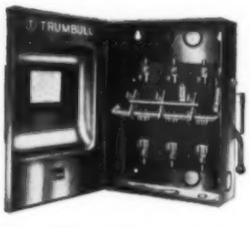
In addition, latest information covering these products is given monthly in "TRUMBULL CHEER."

If you have not yet received your copy of "TRUMBULLIST", or do not receive "TRUMBULL CHEER" regularly, please write us or your wholesaler at once.

Multi-breakers

Type "D"
Enclosed Switches

Power
Panelboards

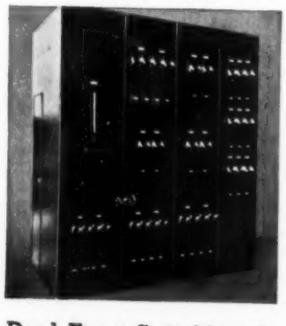


Intermediate Duty Type "C"
Industrial Switches

Unit Lighting
Panelboards

New Type R.B.A. Heavy Duty
Industrial Switches

Feeder Distribution Systems



Dead Front Switchboards

Solderless
Lugs

Over a Quarter Century's Experience

WITH TIME TESTED

ELECTRICAL FUSES

FOR EVERY CIRCUIT

TAMRES PLUG FUSES

The New tamper resisting Plug Fuse approved as Standard by Underwriters' Laboratories, Inc.

Tamres Plug Fuses are made with Standard Edison Screw Base! They can be used in existing Installations either with or without the adapter.

Tools are not required to "set" the adapter in old cut-outs.

The adapter is screwed "home" with the Tamres fuse and remains firmly fixed ready to receive other Tamres Fuses and prevents any attempt to tamper with or to use dangerous heavy capacity substitutes.

Tamres Plug Fuses have no concealed contacts!

ECONOMY - - Renewable Cartridge Fuses and Drop Out Renewal Links.

NATIONAL - - Renewable Cartridge Fuses Powder Packed Renewals.

CLEARSITE - - Plug Fuses—Shows when Blown.

ARKLESS - - - Non-Renewable Indicating Cartridge Fuses.

ECO - - - - - Non-Renewable—Non-Indicating Cartridge Fuses.

ECONOMY FUSE AND MANUFACTURING CO.

Greenview Avenue at Diversey Parkway **Chicago, Ill.**

FARIES

Better **LAMPS** *Greater* **PROFITS**

INDUSTRIAL BRACI ETS
PARABOLIC SHADES
OFFICE LAMPS
SPECIALS!

No. 141½
$9.00

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No. 10-000½
$6.00

Natural-Light

No. 1989
$11.00

No. 153
$4.50

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POLAROID

"GLARELESS LIGHT" $16.50

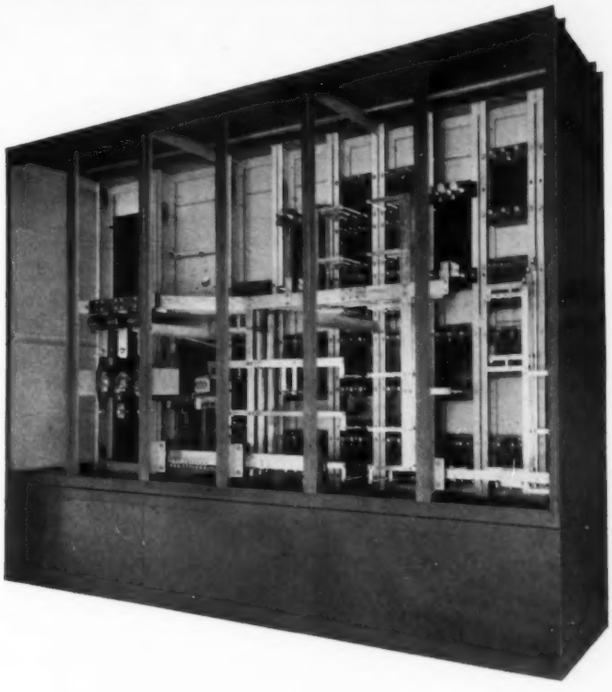
Since 1880 manufacturers of Industrial and Commercial Electric Brackets, Portable Lamps, and Metal Shades.

Superior workmanship and high quality material has made the Faries line a recognized leader in the industry.

Send for our complete catalog or consult your local electrical distributor.

FARIES MANUFACTURING CO.
DECATUR, ILLINOIS

"THE SIGN OF A BETTER JOB"



Take a look at the back of this Special Switch Fuse Type Switchboard and see how every detail of FA construction is designed to simplify installation.

How FA Helps You Protect Against Underestimating and the Cost of Unforeseen Extras

By securing adequate and complete quotations with the help of FA Sales Engineers, Electrical Contractors are guarding their estimated profits. They are protected against underestimating and the inevitable cost of unforeseen extras. They are getting quotations on time — which is so often of vital importance.

More and more they find greater value in this service — because every FA Sales Engineer is thoroughly trained and qualified by long experience to properly figure Panelboard and Switchboard requirements on any job, no matter how complicated it may be.

There are 30 conveniently located FA Engineering Representatives in the U. S. and Canada.

Make it a regular practice to get their help. It protects your estimated profits — takes a lot of work and worry off your shoulders — saves your time — assures adequate quotations — promptness — and a workmanlike job that helps maintain the good reputation you have so carefully built on the solid basis of doing a better job.

Standardized

PANELBOARDS
SWITCHBOARDS
and CABINETS

Frank Adam Electric Company manufactures Standardized Panelboards, Switchboards and Cabinets for use in all types of construction work from the smallest residence to the largest public building . . . FA Standardized Products are listed in Catalog No. 56.

Frank Adam
ELECTRIC COMPANY
ST. LOUIS

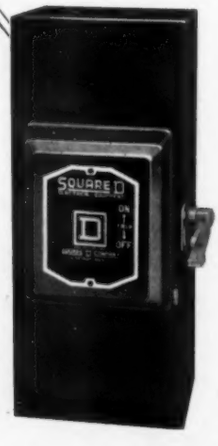
SQUARE D EQUIPMENT FOR EVERY APPLICATION

Saflex Panelboard. Power and Lighting

Multi-breakeR Service Center. Commercial and Residential Lighting

● Square D electrical equipment includes safety switches, range switches, power and lighting panelboards, industrial circuit breakers, Multi-breakeRs, electric motor control and SQUARE-Duct. A complete, quality line for the efficient control and distribution of electric current in the home, on the farm, in commercial buildings and industrial plants.

Circuit Breaker Panelboard. Narrow Type



Industrial Circuit Breaker

Type A, Heavy Duty Industrial Safety Switch

Range Switch with Unfused Main

SQUARE D COMPANY

DETROIT - MILWAUKEE - LOS ANGELES

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

TWO HANDS FULL of 33,000 FITTINGS

Every fitting for every type raceway is now available with T & B's complete manufacturing service.
Each line is complete, and all fittings are designed to give you a good job.
T & B maintain an engineering department to help you with your problems.
Write to T & B if you need special fittings.
Use a trade mark recognized for quality.
Deal with a manufacturer of highest standing in the industry.
Warehouse stocks are for your convenience.
Substantial stocks are carried by distributors.

Where the Underwriters' Laboratories have standards, all T&B fittings are approved.

THE THOMAS & BETTS CO.

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Boston
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*Seattle

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Everstick Anchor Co.

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General Cable Corp.

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Harvey Hubbell, Inc.

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COUNTER SERVICE

LEADERS IN THE INDUSTRY

...Action Service

brings you their products quickly

TO the left is a list of Graybar Suppliers who have helped make possible this "directory" of electrical Supplies and Equipment.

Each of these names is recognized as a leader in its particular product group. The products of each and every one of these manufacturers is waiting your call for "Action-Service," through your nearby Graybar Warehouse.

When you purchase from Graybar, you have a double guarantee of satisfaction—a guarantee from such leading manufacturers as are listed on this page plus Graybar's 69 year old reputation for satisfying the customer.

GraybaR

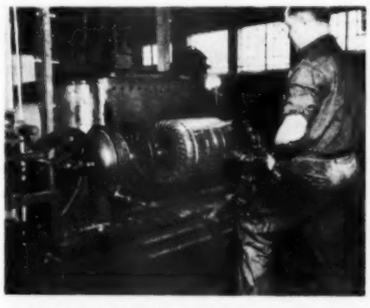
DELIVERY SERVICE

OFFICES IN 85 PRINCIPAL CITIES • EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

Motor Shops

EQUIPPED FOR BANDING ARMATURES

The coal mines around Scranton, Pa., use d.c. motors of sundry types and sizes, so the Scranton Electric Construction Company's shop has a separate banding lathe to handle this type of armature repair work. To cut down handling time this equipment is located in the winding bay, near the varnish vat and ovens. Moreover it is not necessary to disrupt lathe work in the machine shop, when armatures must be banded.



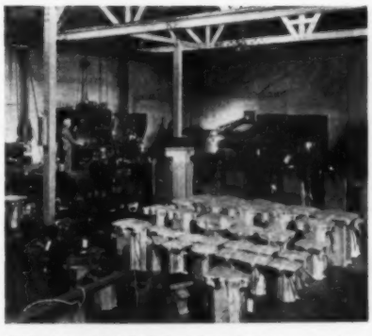
CAN'T-SLIP BANDING—Foot pedal control of rotation also provides automatic brake against reverse roll, when pedal is released.

This company's banding lathe will normally swing armatures measuring 24 in. diameter. The worm gear-head drive and tail stock can be raised by means of auxiliary metal blocks to accommodate 30-in. armatures. Armature shafts measuring seven feet overall may be centered with this outfit. The wire feed bracket may be rolled along the lathe bed to any position, providing a rigid snubbing guide for all sizes of wire. A floor treadle mechanical control engages a disc type clutch on the gear head for rotating the spindle. When the floor treadle is not being pressed down, a strong spring holds the clutch disc in the braking position. This prevents armatures from backing up during a heavy banding operation.

This outfit has a 3 hp. motor V-belted to a 3-speed cone pulley, giving a choice of about 20 to 25 r.p.m. in banding speeds. A set of grooved roller guides on the feed bracket permits the spool of banding wire being racked at the rear side of this banding lathe. The operator's soldering furnace and banding irons are within easy reach at the left of the gear box.

ACID PROTECTION FOR WINDINGS

The Master Electric Motor Repair Company of Paramus, N. J., has a number of large dye houses, among its customers, that have experienced heavy replacement costs for motor windings. According to A. Elmer Trethewey, this trouble was corrected by simply applying a final coating of acid resistive enamel over the double-dipped windings. This enamel can be obtained from the varnish manufacturer. It was thinned about 25 per cent and applied with a spray gun over the baked varnish, thus providing a final seal or film, which excludes the dye chemicals successfully.



TRANSFORMER VOLUME—Quality Electric Co., Ltd., Los Angeles, has proved to local utilities that it can do a good economical job of rewinding and repairing transformers, make street railway motor coils, and render similar services. The result is a fine volume of transformer repair work in this Company's transformer department.

FLOOR PAYOUT REELS

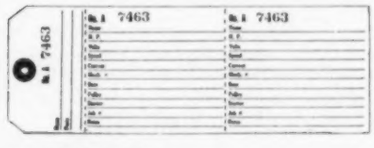
Coil winding at the new Westinghouse motor aisle is a speedy operation requiring a wire payout device which eliminates reel over-run trouble. Here the spools lay flat and the wire feeds through rotating guide arms and eyes. The operator is shown adjusting wire tension by tightening the flanges upon which the guide arms rotate.

SPOOL TENSION—Magnet wire taken from flat wire spool through rotating arms for tension adjustment.

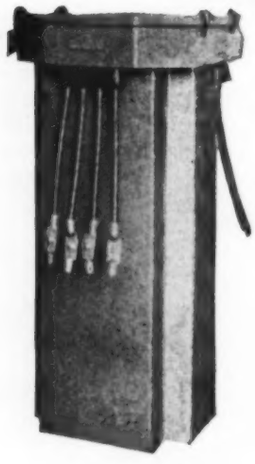
SIMPLIFIED STOCK RECORD

A three-piece numbered tag provides complete identification of aparatus stocked for resale by A. L. Brown Associates, Inc., of Worcester, Mass. When a motor is put into stock its data is entered on both ruled sections of the stock tag. The short stub is tied on the motor, the two ruled data forms, each 3 in. by 3½ in., are filed in the office and stock clerk's file trays for quick reference on telephone inquiries.

When an item is sold these forms are removed from the files, clearing the stock records. A sales order from the office causes the stock card to be routed to the stock clerk who identifies the item by tag number. The reverse sides of each part of this tag are blank to allow additional data to be noted, such as cost, repairs made on reconditioned machines, previous rating if reconnected, also when and where purchased.



THREE-PIECE apparatus tag permits accurate identity at small expense.



Transformers for Today's Requirements

Glance at the list of important design features of AmerTran Type "RS" Distribution Transformers—see below—and you will see that these units possess many refinements which minimize the danger of damage due to usual causes, such as momentary short circuit, lightning surges, overloads of short duration, rough handling, exposure and severe usage. Further, you will note that they are made so that in the event of damage they can be repaired quickly, easily and inexpensively. These features help reduce operating expenses. May we send you Catalog 116 which contains complete data?

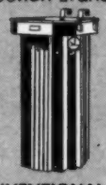
Type "RS" Design Features

1. May be completely dismantled and reassembled with a wrench.
2. Bushings of coordinated flashover type — quickly replaced (no soldering) yet incapable of syphoning oil.
3. External parts rust resistant — tanks of copper bearing steel; covers cast from nickel-iron alloy.
4. Patented clamps permit removal of coil after end iron only has been taken out.
5. All units are of similar electrical and mechanical design in sizes from 1½ to 100 Kva. and for potentials up to 8,000 Volts.
6. Coils of fully balanced design and with ample ventilating ducts are vacuum impregnated in varnish.
7. Rigid core construction prevents damage due to momentary short circuit or rough handling.
8. All units are shipped filled with oil so as to reduce your transportation and installation expense.
9. Design offers high turn-to-turn insulation and optimum impedance characteristic.
10. Optional feature—lightning protection by Crystal Valve lightning arresters and grounding gaps.

AMERICAN TRANSFORMER CO.
178 Emmet St., Newark, N. J.

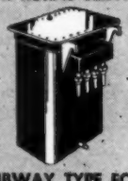
AMERTRAN

AMERTRAN
Distribution Transformers

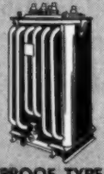


CONVENTIONAL TYPE FOR POLE MOUNTING

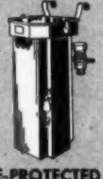
SINGLE-BUSHING TYPE FOR RURAL SERVICE



SUBWAY TYPE FOR SUBMERSIBLE SERVICE



FIREPROOF TYPE FOR INDOOR INSTALLATION



SURGE-PROTECTED TYPE WITH LIGHTNING ARRESTERS

VAULT TYPE WITH JUNCTION BOXES

CONVENTIONAL TYPE FOR OUTDOOR MOUNTING

UNITS WITH EXTRA FEATURES FOR SPECIAL NEEDS

NECA and REA

[FROM PAGE 13]

them of hazards and pitfalls of trying to do own work or of buying their own materials for contractors to install.

6. *Hopeless Precedent*—REA powerless to alter procedure in states where youths are being trained to wire farms by representatives of the cooperatives.

7. *Price Pressure*—REA is pushing starvation prices, advocating cheap labor and general disregarding prevailing costs of doing business. REA is publicizing prices claimed by contractors to have been set up without general acceptance of legitimate contractors. No consideration is given to these ordinary job expenses—delivery, lost or broken tools, depreciation. Because inspectors are incompetent, cheap contractors are cheating and getting by.

Government meddling has encouraged a piece-work labor system to be set up for farmstead wiring. So garage men, telephone men, and other off-color, unqualified border-line workmen swarm into what is logically a contractors market. REA blames contractors for its own failure to make progess, but is unwilling to launch a strong program of support for those contractors, whose services it asks and wants for speeding up this big program.

The Net Result

Out of it all a clear cut issue was laid in REA's lap. Skilled men equipped for fast mass production are wanted to speed REA's program. This means established contractors. The government can't expect to drive them down, when prevailing PWA labor rates are $1.12½ to $1.37½ per hour. Unless contractors can get more money, it seems a hopeless case to tie in with the program.

Contractors came away with this general feeling—

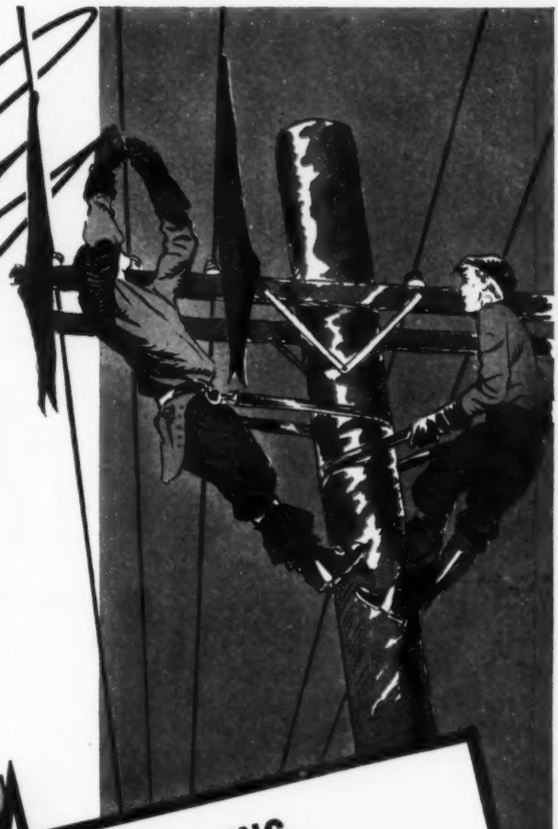
1. That REA has forced a huge program without being properly organized.

2. That experienced electrical contractors have lost ground to outsiders on pole line work, and to a polyglot of other incompetents on farmstead wiring.

3. That the maze of difficulties are being worked out slowly, but many pertinent questions asked by contractors were not answered to their satisfaction.

The absence of the REA Administrator himself from this session disappointed key operators who had anticipated getting direct authoritative answers. They received evasive answers on the much-rumored "Purchasing Authority," on the recognition of qualified bidders for large line projects, on the tightening of general requirements for farm inspections, and on the setting up of fair prices for farmstead wiring. Electrical contractors got no real lift from this session. Consequently three strong resolutions were adopted at the close of the convention that crystallized their feeling toward rural electrification.

Highly INSULATING



You'll find Security Friction Tape in the hands of electricians everywhere...because of its great tensile strength...because it grips like a vise ...and because of its high dielectric strength. When it comes to tape, see that there's more Security on the job.

NON-RAVELING
STRAIGHT TEARING
HIGH TENSILE STRENGTH
HIGHLY INSULATING
STRONG ADHESION

SECURITY

SECURITY BEYOND PRICE AND SPECIFICATIONS

US
United States Rubber Company

ALSO U. S. ELECTRICAL WIRES AND CABLES, LINEMEN'S BLANKETS, SWITCHBOARD MATTING

Questions ON THE Code

Answered by
F. N. M. SQUIRES
Chief Inspector New York Board of Fire Underwriters

A Motor Problem

Q. *"Suppose I have a 50 hp. 220 volt, 3 phase motor with three 4/0 wires. Suppose I wish to run a 2 hp. 220 volt, 3 phase motor also. How would I connect and what size wire will it have to be between the 4/0 terminals and the 30 amp. disconnect switch of the 2 hp. motor? One-fifth of 165 is 33 amps. Would #8 wire be right?"*—A.C.B.

A. The #4/0 wires used as the branch circuit to the 50 hp. motor can be protected by 400 amp. fuses, in accordance with Section 4342, and the 400 amp. fuses would also be the right size for the protector of a #4/0 feeder supplying a 50 hp. and a 2 hp. motor, according to section 4362.

For instance:

50 hp. 3 phase, 220 volt = 125 amp.

This calls for motor protection at 175 amps. and circuit protection at (125 amp. x 300%) = 375 amps. or nearest size fuse 400 amps. and, 50 hp. = 125 amp. while 2 hp. = 6 amp.

According to section 4362—

125x300%	= 375
plus (2hp.)	6
	381 amps.

The nearest fuse size for this load is 400 amps.

But where the circuit for the 2 hp. motor is tapped off the #4/0 mains, a 30 amp. cutout should be provided (with 20 amp. fuses) for the 2 hp. motor and then, of course, #14 wires would be sufficient. If, however, it was not desired to place the cutout at this point, wires of 1/3d (not 1/5th) the size of the feeder, could be used for a distance of 25 feet, if suitably protected from mechanical injury. One-third of 225 amps. equals 75 amps., requiring No. 2 wire.

Adequacy Means Safety

Q. *"I wonder if any of your subscribers know of a cure referring to Article 210, paragraph 2110—1937 Code. I would like to see this put in force. The inspectors we have here are appointed by each incorporated town, but do all inspections on rural lines as well. These inspectors do not ask or require wiring in accordance with this, but issue certificates stating wiring complies with the Code (as per certificate enclosed). It is up to them to require compliance as I see it. What can the contractor do?*

The architects also do not comply in the blueprints. I have called their attention to this, but with no results. If inspectors and architects do not cooperate with us or the Code, I think we need a change—either a Federal or State inspection.

I personally think this Section of the Code is for the best interest of owners as well as the contractors, who are trying to improve a bad condition and eliminate chiseling and inferior work and material, to protect from fire and life hazards. If we do not, how are we going to improve the condition? Each one should do what they can along this line or we will never get any place.

Yours for better workmanship and standard material."—H. K. S.

A. Some inspectors consider that the rule in Section 2110, requiring the installation of a minimum number of receptacles, is an adequacy requirement and is, therefore, not enforceable. It has been found, however, that a lack of an adequate number of receptacles invariably leads to the installation of flexible cord extension wiring, which has proven a decided fire hazard. Therefore, this rule, calling for a minimum supply of receptacle outlets is a safety rule. Inspectors should, therefore, enforce it as a safety measure.

Two committees of the Electrical Industry dealing with adequacy of electrical installations do not consider that receptacles at 20 foot spacings will provide a sufficient degree of adequacy. These committees, the Industry Committee on Interior Wiring Design and the National Adequate Wiring Bureau, both set their specifications and standards at much less than 20 foot spacings for receptacle outlets.

Much publicity and educational work must be done among the inspectors, contractors, architects, professional and estimating engineers, builders, owners, mortgage companies, banks and all other interests loaning money or insuring loans for household improvements and building, in order to make everyone realize that the National Electrical Code rule is a safety requirement. Greater safety and also more convenience and comfort can be secured through the use of more receptacles than by the few required by the National Code.

Parkway Cable Between Buildings

Q. *"Is it permissible to use Parkway Cable between two residences if the cable is fused at each end before it enters the building?"*—J.K.

A. An approved make of Parkway Cable type USE (Underground Service Entrance Cable) is permissible under the National Electrical Code for use between residences. Section 2303 prohibits supplying one building through another except when both buildings are under single occupancy or management. If these provisions are met the supply to the second building should be protected by fuses and be controlled by a switch located either in the first building or at the point where the feed enters the second building. The second building, however, whether under same occupancy or management as the first building or not, may be fed *from* the first building (but not through it) in the following manner:

Service wires for the second building may be connected to the service wires in the first building ahead of the service equipment and looped to the second building, but must be kept outside of first building (except for the part up to the service equipment). If the meter is placed on the street side of the service equipment then this connection must be made ahead of the meter. Then of course, service equipment must be installed where the service enters the second building.

BULL DOG

Trol-E-Duct

UNIVERSAL TYPE

A NEW WIRING SYSTEM

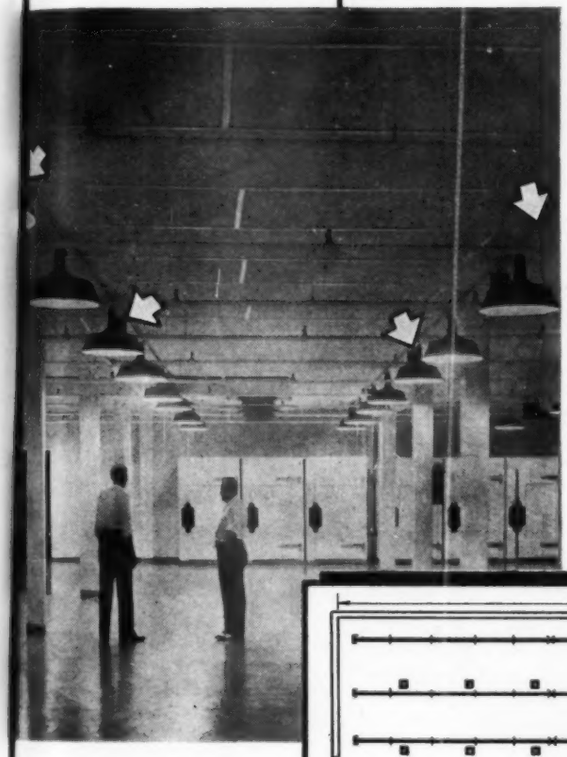
Distinguished By

LESS VOLTAGE LOSS *Plus* MORE FLEXIBILITY

Trol-E-Duct—a Busway Wiring System with fixed size 50 Amp. Bus Conductors—permits use of large capacity circuits in lieu of several small ones. This reduces voltage loss and effects greater efficiency and economy in current consumption.

Movable Trolley Collectors or Semi-fixed Twistout Plugs, inserted at any point in the slotted Duct, provide *flexible* Light and Power Outlets where and when desired.

A complete assortment of Fittings makes possible a Wiring System to fit the layout of any building and the initial installation or later changes or additions can be more quickly and economically made than with old type, conventional Wiring Systems.



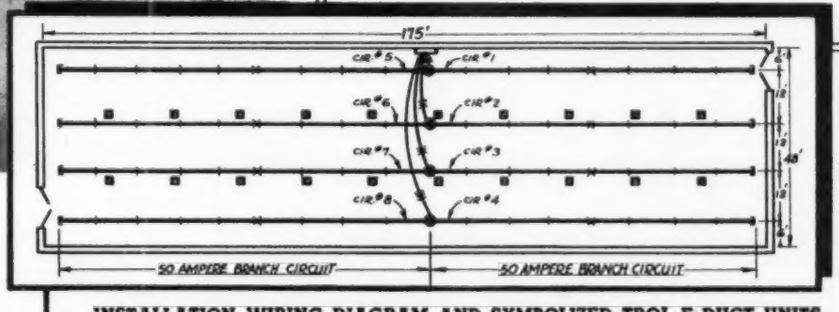
In this air conditioned manufacturing Department, devoted to precision work and solely dependent on artificial lighting, four runs of Universal *Trol-E-Duct* support and feed 30 400 Watt high intensity Mercury Vapor Lamps and 30 750 Watt Mazda Lamps, alternately spaced.

The Lamps are suspended from the Duct by Bull Dog heavy duty weight supports. Tap-offs from the Duct to the Lamps are Terminal Type Twistout Plugs.

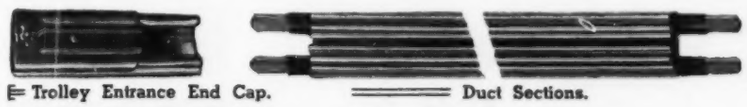
Universal *Trol-E-Duct* was chosen as the Wiring System because of: (1) The ease and quickness of installation. (2) The fixed size of its ample conductors which reduces voltage loss with consequent greater efficiency in illumination and economy of current and (3) its flexibility for future changes or additions.

ADEQUATE WIRING SERVES AND SAVES

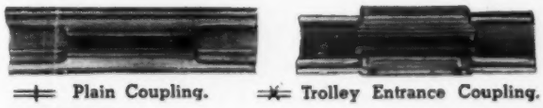
Write for pocket size booklet: "How to mobilize lighting and power units with TROL-E-DUCT."



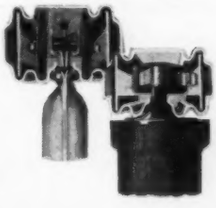
INSTALLATION WIRING DIAGRAM AND SYMBOLIZED TROL-E-DUCT UNITS



Trolley Entrance End Cap. Duct Sections.



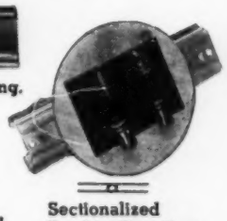
Plain Coupling. Trolley Entrance Coupling.



Cross sectional view of the Movable Trolley (left) and the Semi-fixed Twistout Plug inserted in Duct.

Hangers—spaced on 5 Ft. Centers.

Conduit and Wire.



Sectionalized Feed-in Coupling.

Bull Dog Distribution Center.

Close-up of the 400 Watt, high infensity, *Mercury Vapor Lamp* suspended from the *Trol-E-Duct* and electrically connected thereto through Lamp Auto-Transformer and Terminal Type *Twistout Plug*.

Close-up of the 750 Watt *Mazda Lighting Unit* suspended from the *Trol-E-Duct* and electrically connected thereto through outlet box and Terminal Type *Twistout Plug*.

BULL DOG ELECTRIC PRODUCTS COMPANY

Pioneers In Flexible Electrical Distribution Systems

DETROIT, MICHIGAN

BULL DOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO, ONT.

Manufacturers of Vacu-Break SAFETY SWITCHES, PANELBOARDS, SWITCHBOARDS, DUCT SYSTEMS

Questions ON Signalling

Answered by
ALBERT A. SCHUHLER

Providing for Our Loads

Q. *A low-tension call system has recently been extended and more bells have been added. The system is operated from a push button and all bells operate simultaneously. A large arc has been observed at the push button, and this has caused considerable pitting of the contact spring. It has been going on for some time and has resulted in signal failures. What can be done to obtain satisfactory results?* —L. T.

A. The trouble described is obviously caused by an overloaded circuit. There are two ways of overcoming this difficulty. (1) Install a heavy duty type push button, preferably with quick-break contacts, having a carrying capacity sufficiently large to carry the entire load. (2) Replace the present push button and add a relay, using the button to acuate the relay. The contacts of the relay which must be of ample capacity, may then be used to carry the load on the circuit.

Garage Doors Double Control

Q. *How may photo-electric equipment be installed to open garage doors for an automobile, but prevent operation of the doors when the ray is intercepted by a person?*—A. T.

A. The most common and successful method of accomplishing the desired results is to install two pairs of light sources and photo-cell units. The two light sources would be mounted on one side of the driveway approximately six feet apart, and about thirty inches on centers above the roadway. The two photo-cell units are mounted on the opposite side of the driveway, the same distance apart, at the same height, and in line with the light sources.

The two photo-cell units are arranged so that their respective relay contact springs are connected in series. This will necessitate "breaking" of both light rays simultaneously in order to actuate the door control relay.

Continuous Ringing Bell

Q. *How may single-stroke type bells be operated continuously over a pre-determined period of time?*—N. O.

A. One method is to insert a flashing device in the circuit. This may be a motor-driven flasher, a hot-wire interrupter or a thermal flasher. These devices are used in connection with a timing device such as a time limit relay or switch. A spring-driven interrupter may also be used having the proper reserve capacity to operate for a specified length of time.

Heat Detector for Vaults

Q. *What method is followed in the protection of a vault door against attack by the torch? How does the protective equipment operate in such a system?*—G. S.

A. The usual method followed to prevent attack by the torch is to provide a heat detector as near as possible to the door, inside the vault. Usually this detector is mounted on the ceiling of the space between the outer and the inner doors.

The heat detector is adjusted to a pre-determined temperature and is actuated when heat rises to a specified temperature in its vicinity. When the detector is actuated, electrical contacts are made so as to transmit a signal to any desired location.

Interior and Exterior Fire Alarm

Q. *How may an interior plain code fire alarm system be connected to a municipal system?*—L. W.

A. The common practice is to install a selective relay in the wiring between the local interior and the city fire alarm system, to insure against false alarms being sent to the exterior system. These false alarms might ordinarily originate from open or grounded circuits.

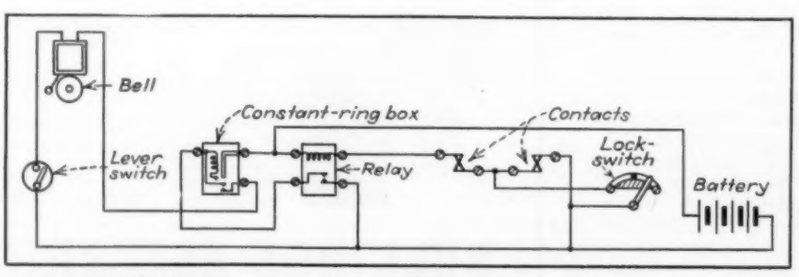
The selective relay will only operate the city fire alarm box when a complete coded alarm is transmitted from an interior fire alarm box. Before making any such arrangement, the municipal authorities must be consulted, because of certain circuit requirements.

Constant-Ring Drops for Closed-Circuit Alarms

Q. *How may a constant-ring drop be used in conjunction with a relay in a closed-circuit burglar alarm system? The system is to operate from a battery, and the audible signal will be a small bell.* — W.D.

A. The wiring diagram for this circuit indicates that the closed-circuit non-locking relay is used in the protection contact circuit, while the constant-ring drop is used to operate the audible signal.

The lever switch shown in the circuit is used to silence the bell after an alarm has been transmitted. The lock-switch is used to enable persons in authority to enter the premises without operating the alarm.



***BURGLAR SYSTEM**—Constant alarm after contacts open, with provisions for entering premises with special lock switch that shunts door contacts.*

HAZARD

SERVICE ENTRANCE AND DROP CABLES

ADEQUATE WIRING SERVES AND SAVES

(1)

(2)

SERVICE ENTRANCE CABLE STYLE ABN
costs little, as it may be strapped to house without conduit. May be used with outdoor meter, or through foundation to entrance switch. Concentrically wound uninsulated neutral conductor and closely wound steel tape discourage current diversion.

SERVICE ENTRANCE CABLE STYLE UBN
differs from Style ABN, in that the steel tape is replaced by a heavier double-wrapped tape cushion, and that the concentric conductor has more wires giving a closer coverage to make it diversion-proof.

CONCENTRIC DROP CABLE TYPE SD
from pole to entrance cable on house. With single-hole entrance cap and rigid conduit, it is used from pole to meter. The closely wound concentric conductor makes it diversion-proof. Outer braid is finished with battleship grey paint.

UNDERGROUND SERVICE ENTRANCE CABLE
for service to or between buildings. Sizes No. 12 and larger. Armortite (1), and Hazasheath (2), are non-metallic armored, and withstand alternate wet and dry conditions, acid or alkaline moisture, and extremes of heat and cold.

HAZARD INSULATED WIRE WORKS
DIVISION OF THE OKONITE CO.
WORKS: WILKES-BARRE, PENNSYLVANIA

New York Chicago Philadelphia Atlanta Pittsburgh Buffalo Boston Detroit
Seattle Dallas Washington San Francisco St. Louis Los Angeles

In the News

EASTERN INSPECTORS WEIGH CODE TRENDS

The Baltimore meeting of the Eastern Section IAEI, held September 6 to 8 reflected the attitude of the inspectors on three important topics—EEI's proposed Code changes, NEMA's recently completed study of the current carrying capacity of code wires and cables and the National Adequate Wiring Campaign.

The proposed changes in the Code were discussed by R. B. Ward, chairman of the Code Standards Committee. Henry Morton of the Detroit Edison Company appeared as the Edison Electric Institute spokesman. Out of this discussion came two important actions. EEI will send to each member of IAEI the full particulars of its proposed Code changes. The Eastern Section took no action from the floor, drafted no resolution to express the opinions of its members. Instead the data forthcoming from EEI will be studied by the inspectors, out of which sectional or chapter discussions will crystallize opinion before the next annual section meetings.

The report of the NEMA sub-committee on carrying capacity of Code insulated wires and cables, gave the findings of eight years of research on the ratings for rubber insulated conductors. The safe operating temperatures of cables in open air as compared with conduit installations, the effects of variations in ambient temperature, and other related data were covered. M. M. Brandon, Underwriters Laboratories, Inc., presented the report.

Other speakers and subjects included: the Adequate Wiring Campaign, presented by O. C. Small, of the National Adequate Wiring Bureau; "What Cities Expect from the Electrical Inspector and IAEI" by Paul V. Betters, U. S. Conference of Mayors, Washington; "A New Relationship in Industry" by H. C. Calahan, National Electrical Wholesalers Association; and a new slide film by J. W. Whittington, Electrical Cord Manufacturers. Early morning Code chats were well attended.

These officers were elected: Arthur L. Holbrook, Waltham, Mass., president; Joseph Hagendorn, Hewlitt, L.I., first vice-president; James D. Lynett, New York City, second vice-president; A. W. Hopkins, Springfield, Mass., treasurer; F. N. M. Squires, New York City, secretary; and R. B. Ward, Newark, N. J., W. J. Canada, New York City, and C. A. Berlepsch, New Haven, Conn., executive committeemen.

CARLSON HEADS UNION SHOP COMMITTEE

One of the "heavy" jobs at the Detroit NECA Convention fell to E. C. Carlson of Youngstown, Ohio, who presided during several sessions of the Union Shop Section and was subsequently elected as chairman of this group. Following caucuses by regional employer groups, this section conferred on Tuesday evening and met again on Wednesday afternoon, with heavy attendance throughout. The union shop section of NECA is conducted for members who exclusively employ members of the International Brotherhood of Electrical Workers. Serving with Mr. Carlson on the eleven-man committee that represents NECA's union employers are: Clyde L. Chamblin of San Francisco as vice-chairman and A. Lincoln Bush of New York as secretary.

E. C. CARLSON of Youngstown, Chairman of NECA Union Shop Section.

Mr. Carlson is president of the Carlson

RURAL MODERNIZATION—An already electrified farm near Webster, N. Y., was completely rewired and re-equipped with appliances, machines and modern lighting to provide the country's largest-scale electric proving farm. Here are some agricultural and home economic experts inspecting this 200-acre fruit and dairy farm. Westinghouse, cooperating with Cornell University, Rochester Gas & Electric Corp. and 16 other manufacturers staged the party.

How the FUSTAT helps bring ADEQUATE WIRING . . . *more quickly*

What is the Fustat?

It is a fuse to which a thermal cutout is added.

It gives all the protection of a fuse.

It protects against permanent overloads, even when as light as 25%.

Yet it will not blow on motor starting currents.

It has a non-tamperable base that stops anyone from robbing the circuit of protection.

It fits Edison base fuseholders through the use of an inexpensive adapter that locks in place.

Retails at 7½c

Adequate wiring means—more circuits installed

The Fustat prevents permanent overloading of the circuit. When additional circuits are needed the user cannot side-step the issue. The Fustat cannot be replaced with one of larger size or with a penny, and tampering it in any way is virtually impossible.

Adequate wiring means—more outlets per circuit

The Fustat permits adding a maximum number of outlets to the circuit. The circuit cannot be overloaded regardless of the number of outlets. Hence adding extra outlets is a perfectly safe practice.

Adequate wiring means—more satisfactory operation of appliances

The Fustat prevents low voltage conditions that so frequently cause dissatisfaction with appliances — because the Fustat keeps users from loading circuit beyond the proper capacity of the copper.

Adequate wiring means—more appliances in use

The Fustat permits adding more appliances to a circuit. It doesn't blow on motor starting currents or other harmless overloads. The circuit can be loaded to approved capacity without needless blows — and without sacrifice of safety.

Adequate wiring means—more consumer good will

The Fustat builds good will by eliminating many annoying service calls.

The Fustat prevents loss of good will that often results from fright or expense caused by flexible cord shorts burning out due to tampered or over-size fuses . . . or to protective devices that don't operate fast enough to protect against such shorts. The Fustat assures safe *fuse* protection that remains safe.

The Fustat stops scare headlines and stories that blame fires on so called "defective wiring". Usually "defective wiring" means the protective device was tampered and could not open when trouble occurred. Every Fustat installed means that much less chance of scare headlines making users think electricity is dangerous.

The Fustat helps bring adequate wiring — more quickly — and it helps keep wiring adequate

The FUSTAT

Retails at 7½¢ in 15 to 30 amp. sizes

For full information write to any of these Firms

BUSSMANN MFG. CO., University at Jefferson, St. Louis, Mo.
JEFFERSON ELEC. CO., Bellwood, Ill.
KIRKMAN ENGINEERING CORP., 121 Sixth Ave., New York City
NATIONAL ELECTRIC PRODUCTS CORP., Fulton Bldg., Pittsburgh, Pa.
UNION INSULATING CO., 27 Park Place, New York City

[FROM PAGE 94]

Electric Company. He was recently elected president of the Ohio Construction Council at the Council's annual meeting in Columbus. The council represents all Ohio employers in the construction industry. Special interest is given toward observance of safety regulations and to reduced rates for workman's compensation insurance.

WESTERN INSPECTORS IN CLEVELAND

Problems of interpretation and enforcement raised by the 1937 revision of the National Electrical Code were front at the 34th Annual meeting of the Western Section, International Association of Electrical Inspectors, in Cleveland, September 19-21. The meeting attracted 440 members and guests from the eight member Chapters which form the Section.

Article 2110, determining receptacle spacing, came up for much discussion. Members of the committee say further distinction should be given between room occupancies and types of buildings. Compromises already made in many areas are a warning that some revision will be required or this rule, generally conceded to be desirable, may be removed entirely from the Code.

The Edison Electric Institute proposals for broad alterations in the National Electrical Code, which were widely discussed at the Eastern and South-Eastern Section meetings, were touched upon in the president's opening address, but did not come up for general discussion at this meeting.

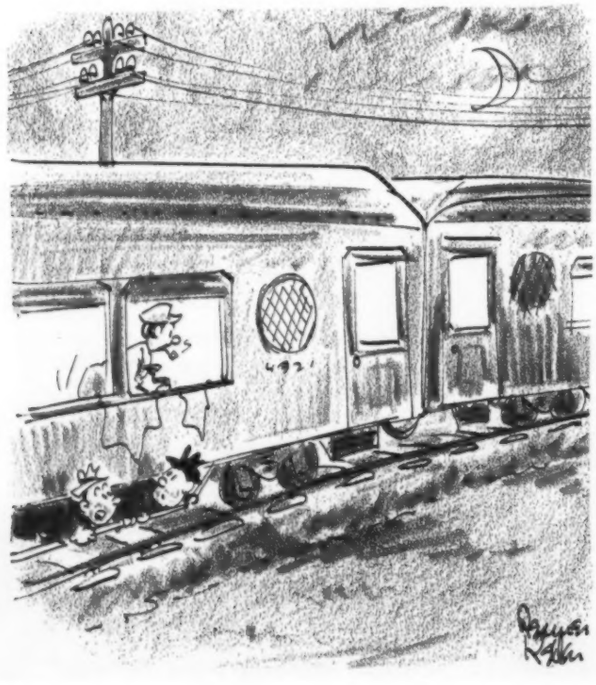
In addition to the detailed article committee reports, the program included addresses by International officers H. N. Pye of Atlanta and Victor H. Tousley of Chicago, by A. E. Schanuel of the Adequate Wiring Bureau; C. M. Ripley and L. F. Adams of General Electric Company; Samuel J. Rosch of NEMA and R. W. E. Moore of National Electric Products Corp.

Discussing a program of re-inspection, L. J. McCormick, Chief Inspector of Kansas City, Mo., outlined the work of his department in reinspecting residences and industrial buildings. L. P. Dendel of Lansing, Mich., spoke of the progress in state electrical laws. A number of "Code Breakfasts" were held under the guiding hand of A. T. Babbitt of Lansing, Mich.

New officers elected for the year were President, L. P. Dendel, Lansing; First Vice President, James Galbraith, Detroit; Second Vice President, J. B. Wilkinson, Milwaukee; Secretary-Treasurer, F. H. Moore, Indianapolis.

GALBRAITH DETROIT CHIEF INSPECTOR

James Galbraith, assistant chief electrical inspector for the city of Detroit since 1914, has been appointed chief electrical inspector. He succeeds Ben W. Clark who retired on July 31. Mr. Galbraith began his electrical career in Port Huron, Mich. at the age of 14 as an electrician helper. In 1905 he became an electrical inspector and was appointed Assistant Chief Inspector in Detroit in 1914. He is an active member of the International Association of Electrical Inspectors.



"I'm havin' the electrician put a light down here so we can see to read."

HART TO NECA EXECUTIVE COMMITTEE

M. E. Hart of the Hart Enterprise Electrical Company, New Orleans, was elected Executive Committeeman for Division 8 at the recent Detroit NECA Convention. Mr. Hart's territory includes the states of Arkansas, Louisiana, Oklahoma, Texas, New Mexico. Mr. Hart has an active interest in contracting affairs, both in heavy industrial and public construction work, and in rural electrification projects.

M. E. HART, New NECA Executive Committeeman for Division 8.

INDICTMENTS IN NEW YORK CASE

Nine prominent electrical contractors of New York were indicted by the grand jury on September 24 and 26 in connection with the so-called New York City "racket" case. They are: Harry Fischbach, president, Fischbach & Moore, Inc.; John G. Livingston, president, J. Livingston & Co.; Arthur S. Henry, vice president, L. K. Comstock Co.; John L. Flagg, president, Watson Flagg Engineering Co.; John T. Kallenburg, treasurer, Watson Flagg Engineering Co.; Louis Kalischer, president, Louis Kalischer, Inc.; Frank W. Cooper, Secretary, John G. Livingston & Co.; Loran C. McNutt, president, McNutt, Watts & Tankard; and Robert A. Goeller, president, Hatzel & Buehler, Inc.

The indictments were secured by District Attorney Thomas E. Dewey, who is investigating the alleged conspiracy said to involve Local No. 3, International Brotherhood of Electrical Workers, and some 40 odd electrical contractors and 29 electrical manufacturers, all of New York. The bill against these nine contractors charges frauds in submitting collusive bids on electrical work for the Consolidated Edison Co., Brooklyn Edison Co., New York Central Railroad and the City.

PRIVATE INTERIOR TELEPHONE SYSTEMS

...are Causing a Lot of Comment

While Private Interior Telephone Systems are not new, people are demanding them more than ever. They have become communication conscious—aware that interior telephone facilities can be used—are being used—to advantage in all kinds of offices, shops, factories, clubs, hotels and homes.

Automatic Electric will help you cash in on this business. This equipment is definitely within your province, the market is broad and still practically untouched, and the profits are attractive.

Below are four of the many varieties of private interior systems available. Our field representative will gladly supply you with literature, prices and discounts, as well as work with you on specific jobs. Call on him.

INTERCOMS

Common-talking, selective-ringing systems in capacities of two to eleven stations. Beautifully designed, and durably constructed for long faithful service.

SERV-U-FONES

Attractively priced common-talking systems in capacities of two to ten stations. Conveniently packaged, simple to install. Dry cell operated.

AUTO-COMS

Deluxe intercom. systems, providing selective talking and selective signaling service for a maximum of ten stations, and up to five connections at one time. No automatic switchboard needed.

P-A-X's

Private Automatic Exchange systems, available in all capacities. Use standard automatic telephones and provide for a variety of special communication services.

AUTOMATIC ELECTRIC

PRIVATE INTERIOR TELEPHONE SYSTEMS

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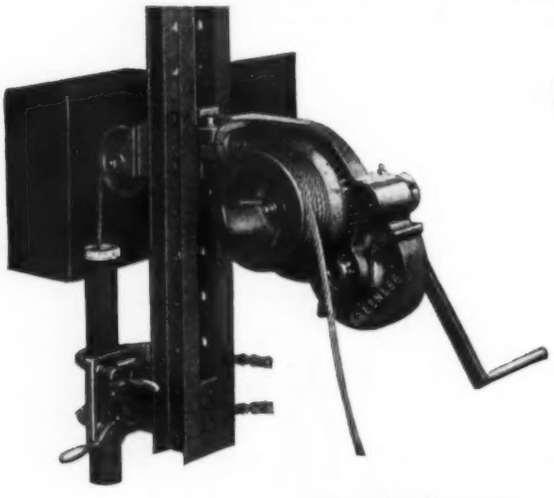
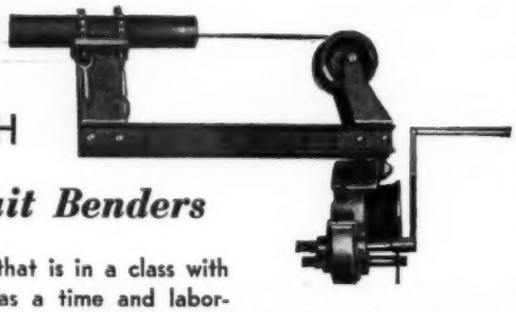
Put Efficiency in
YOUR CABLE PULLING
With the GREENLEE



Portable
Powerful
Convenient

Left: Pulling into a box from vertical section of conduit.

Below: Pulling from end of horizontal section of conduit.



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Here is a new cable puller that is in a class with Greenlee Conduit Benders as a time and labor-saving device. It is easily clamped right to the conduit through which cable is to be pulled, preventing the loosening of hangers. The drum can also be used as an ordinary winch, since a base is provided on it for bolting to a plank. Provision is made for two operators, when required. Weighs only 170 pounds, and tension drum can be quickly removed for easier portability. Let us tell you more about it.

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In the News

[FROM PAGE 96]

MOUNTAIN STATES STRONG FOR ADEQUACY

Continued stress on adequate wiring was pledged to contractors at the Rocky Mountain Electrical League annual convention, held at Yellowstone National Park, Aug. 29, 30 and 31. This group has worked on wiring for years, formerly as the Electrical League of Colorado. Adoption of the National Adequate Wiring standards, the continuation of field work, and the stimulation of wiring activity among more local leagues, provides a long-time program according to George Lewis, secretary-manager. R. Y. Chedister, Mid-West Electric Wiring Co., Denver, has been the chairman of the League's contractors division during the past year.

SOUTHERN INSPECTORS TO MAKE CODE STUDY

The Southern Section of IAEI, meeting at Jacksonville, Fla., September 12–14, approved the appointment of a special committee to study proposals for changes in the National Electrical Code, as developed by the Edison Electric Institute. The committee was not empowered to commit the organization by any of its findings or recommendations.

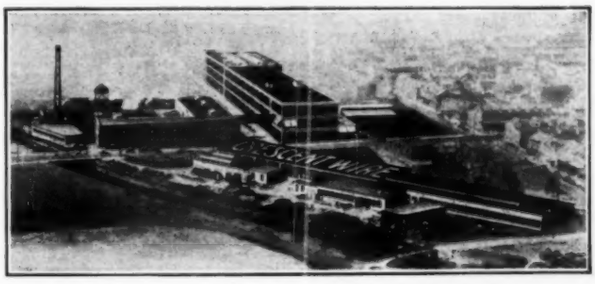
A cooperative plan of financing wiring for ranges and water heaters and the allocation of these jobs to local contractors was explained by Ernest E. Anders, city commissioner of Jacksonville. Other speakers presented important topics before an unusually well attended convention.

New officers of the Southern Section are: A. J. Bommer, Dallas, Texas, president; C. S. Whitaker, Durham, N. C., first vice-president; Frank G. Camus, Shreveport, La., second vice-president; Joseph Whitner, Atlanta, secretary and treasurer. Representatives on the International executive council: T. W. Bowry, Richmond, Va.; N. E. Cannady, Raleigh, N. C.; H. N. Pye, Atlanta; George Welman, New Orleans; and E. A. Thibodeaux, Thibodeaux, La. Walter A. Stall, general convention chairman and chief electrical inspector, City of Jacksonville, was elected to the executive committee.

WISCONSIN RULES ON ELECTRIC FENCES

The Wisconsin Industrial Commission has issued general orders providing that all electric fence controllers and converters sold or installed in Wisconsin after Oct. 6, 1938, shall comply with its requirements and be approved by the Commission. Controllers in use prior to Oct. 6, 1938, shall be made to conform to these orders by Jan. 1, 1940. The Commission's orders require that electric energy supplied to

VARNISHED CAMBRIC • RUBBER POWER CABLES • BUILDING WIRE • RADIO WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • ARMORED CABLE • CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE



Lincoln said:—

"A man's legs should be just long enough to reach the ground"

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CHICAGO, ILL., Crescent Electric Sales Co., 634 W. Adams Street
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CLEVELAND, OHIO, The Henger-Fairfield Co., 1808 Columbus Road
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NEW YORK, N. Y., Kearton & Nagle, 555 W. 25th Street
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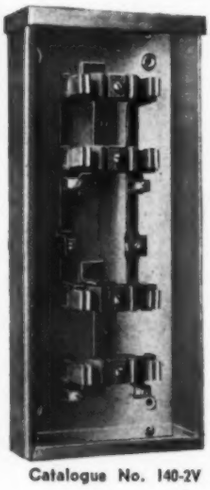
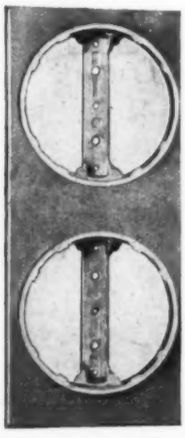
Every improvement, every feature, every requirement of best engineering practice is included in these Meter Boxes. Built to save you time in mounting and wiring—yet offer a good job of wiring everytime, these Meter Boxes are just what the industry has long waited for. In the words of the industry they are next to perfection.

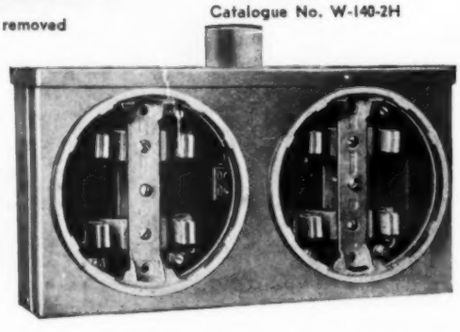




Catalogue No. 140-2V with cover removed

Above:
Catalogue No. W-140-1V

Below:
Catalogue No. W-140-2H



In addition to saving wiring time, these Meter Boxes add quality and beauty to any job in any home or office. The cost? Very moderate.

WIRING—Only one screw per Meter need be removed to release cover, leaving all the connection terminals fastened permanently. After cover is removed it allows free access to all the terminals which assures a good wiring job every time.

INDOOR or OUTDOOR—Weatherproof for the outdoor mountings and modern and neat for the indoor mountings.

BUS BARS—These Meter Boxes can be furnished with or without Bus Bars.

UNITS—Any number of units you desire up to 10 can be furnished.

SPACING—These Meter Boxes have standard spacing throughout.

WRITE TODAY FOR CATALOGUE

WALKER
ELECTRICAL COMPANY
ATLANTA, GEORGIA

In the News

[FROM PAGE 98]

fences shall be so controlled it cannot become hazardous under the most severe conditions.

Controllers supplied in excess of 15 volts and not insulated between primary source and fence, also continuous vibrator types delivering over 5 milliamperes r.m.s. or 25 milliamperes peak, are prohibited after Oct. 6, 1938. Electric fences installed along highways or as property line fences, must be identified by approved signs clamped to the wire, or fastened to posts at intervals of not more than 200 feet.

COMING MEETINGS

International Association of Electrical Inspectors — Northwestern Section, Hotel Davenport, Spokane, Wash., Oct. 3–6; Southwestern Section, Long Beach, Calif., Oct. 10–12.

Ohio Electrical Contractors Association—Annual Meeting, Cincinnati, Ohio, Oct. 18–20.

National Electrical Wholesalers Association—Semi-annual Convention, Drake Hotel, Chicago, Oct. 18–21.

National Electrical Manufacturers Association—Annual conference, Palmer House, Chicago, Ill., Oct. 24–28.

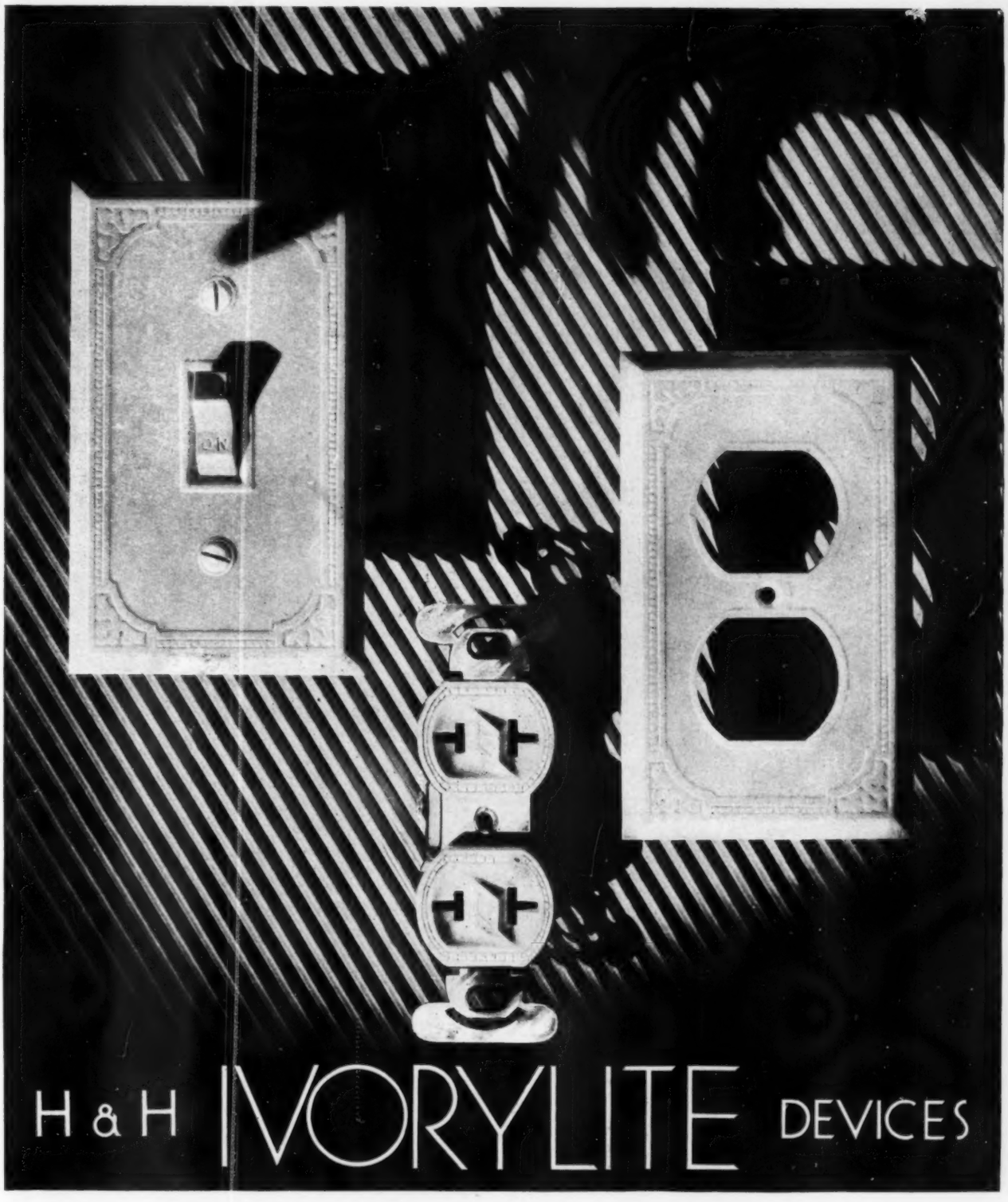
MANUFACTURERS NEWS

Allis-Chalmers Mfg. Co., has moved its Boston office to the Park Square Bldg., 31 St. James Ave. W. F. Taylor remains as manager.

J. B. Mitchell has been appointed sales manager of the Monarch Fuse Co., with headquarters at Jamestown, N. Y. He was formerly Baltimore district sales manager of the Economy Fuse Co.

J. G. Skirm, formerly assistant manager of the Fibre Conduit Division of Brown Co., has been appointed manager to succeed Mr. Edmund Burke, who recently retired. Mr. Skirm will be located at 420 Lexington Avenue, New York.

Westinghouse Electric and Manufacturing Co., has announced a new Air Conditioning Department with headquarters at the East Springfield, Mass., plant. P. Y. Danley has been appointed manager of the new department and H. F. Hildredth will direct the sale of home air conditioning equipment. S. F. Myers has been appointed assistant manager, and will be located in Chicago.



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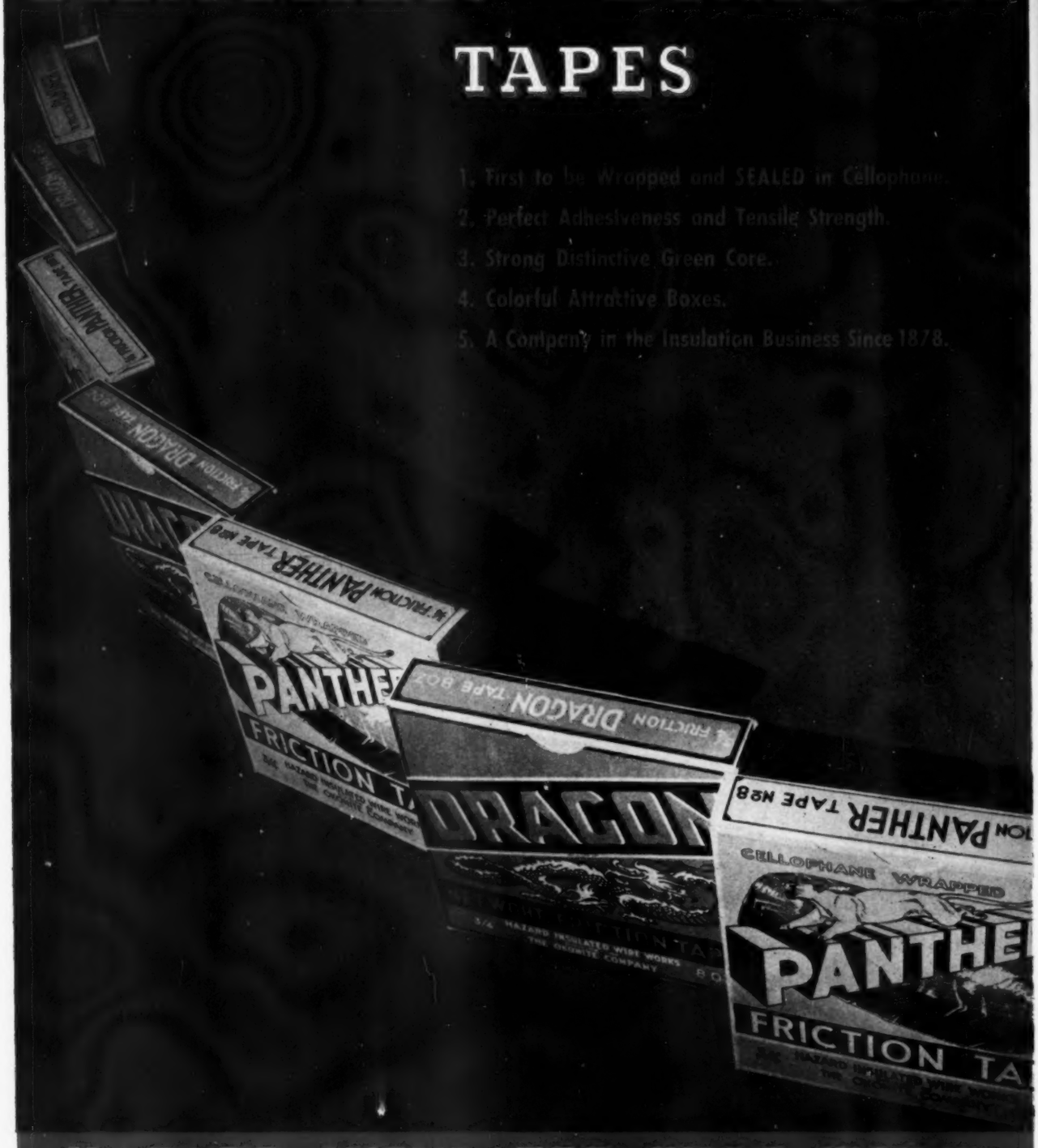

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ELECTRICAL

Maintenance

INDUSTRIAL AND COMMERCIAL

LOOK AHEAD OF SYSTEM TROUBLE

NO electrical system is immune from occasional difficulties. Preventive maintenance, therefore, tells its own story in year round freedom from plant delays. So maintenance men, who can claim good records, usually have definite policies which govern their system of operation.

Trouble in electrical systems is not only due to lack of inspection and repair. Successful maintenance must embrace the choice of equipment and its proper application to the service for which it was designed.

Trouble prevention, then, means keeping informed as to what is best for changing demands in production and how new devices or methods will help. These Guide Sheets are designed to simplify the process for you.

This series of articles began in January with a frank review of the electrical maintenance man's job. Then came—

1. ALTERNATING CURRENT MOTORS—Types and Applications
2. DIRECT CURRENT MOTORS—Types and Applications
3. ALTERNATING CURRENT MOTORS—Maintenance
4. DIRECT CURRENT MOTORS—Maintenance
5. A.C. MOTOR STARTERS AND CONTROLLERS—Types and Applications
6. D. C. MOTOR STARTERS AND CONTROLLERS—Types and Applications
7. MAINTENANCE OF CONTROL EQUIPMENT
8. SPECIAL CONTROL PROBLEMS—Heavy Installations and Maintenance
9. ELECTRIC DISTRIBUTION—Circuit Protection—Power Factor Correction (*this issue*)

Coming articles will discuss:

10. LIGHTING—Applications and Maintenance
11. ELECTRIC HEAT—Types, Applications and Maintenance
12. ELECTRIC WELDING—Types, Applications, Control
13. INTERPLANT COMMUNICATION—Types and Common Maintenance Problems
14. INSTRUMENTS—Types, Application, Care
15. POWER TOOLS—Types, Application, Care
16. BATTERIES AND RECTIFIERS—Types and Maintenance
17. ELECTROPLATING — Maintenance Aspects
18. ELECTRONIC DEVICES—Types and Applications

Distribution Systems

Wiring, Circuit Protection

Power Factor

ONE of the jobs for the electrical maintenance man is to keep the plant electrical distribution system in operating condition so that production can be kept to schedule. The maintenance of the system is equally as important as the maintenance of the production machinery.

The principal elements of system maintenance are: design; installation; operation; service and repair records and drawings; and specific maintenance routine. To have a working knowledge of these elements, the electrical maintenance man must have full data on the original system. He must know where changes or additions are required. He must maintain a regular schedule of periodic inspection, testing, and servicing.

The electrical distribution system in the plant will be considered as having its origin at the generator switch, or at the main disconnect or circuit breaker at the service entrance. The system includes all the equipment from the primary or high voltage service to the connections at the electrically operated machines or devices.

The system may be divided into three general classes: (1) power for operation and process, such as motors, heating and welding, (2) lighting, general and supplementary, and (3) low tension service for alarms, plant intercommunication and signals.

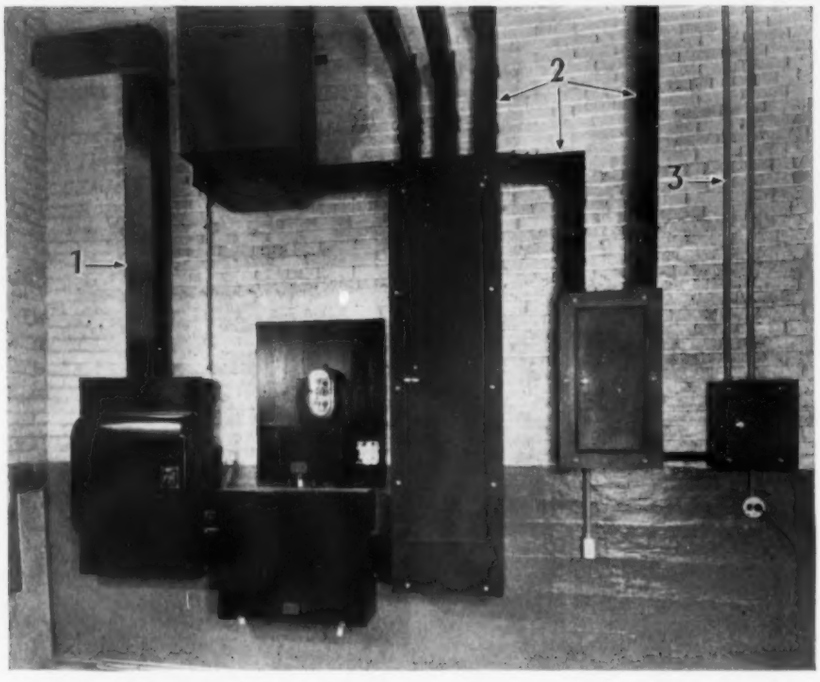
Equipment for distribution systems, particularly for power and lighting service, comprises primary and secondary cables, transformers, switchgear, circuit-protection devices, sub-feeders, distribution centers, and branch circuit wiring.

The maintenance man should be well acquainted with electrical codes in effect in his locality. Chiefly, these are: the National Electrical Code, National Electrical Safety Code, Factory Mutual or Millers Mutual Codes, and the local municipal code. All these provide regulations governing system design, equipment selection and installation.

Here are some references to the 1937 National Electrical Code applying to the installation of distribution equipment:

1. Definitions—Article 100;
2. Transformers and Vaults—Article 450 and Section 4521;

***POWER DISTRIBUTION** planned for plant expansion. Here heavy circuits are controlled from a central point. High voltage service and feeders at right, m-g controls and d.c. feeders at left.*



THREE METHODS of electrical distribution—Incoming enclosed busbar (1) feeding main safety switch to main distribution panel. Wireway or cable duct (2) encloses branch wires leading from main panel to various motors. Conduit or tubing (3) encloses other circuits taken from small panel. (Bull Dog Electric Products Co. Photo)

3. Feeders—Article 220, Section 2408, Tables 10, 15 and 17;
4. Branch Circuits—Articles 100 and 210;
5. Switchboards and Panelboards—Article 384;
6. Overcurrent Protection—Article 240;
7. Motors and Controllers—Article 430, Tables 10 through 16; Diagram 14;
8. Capacitors—Article 460, and Section 104,601;
9. Wiring—Articles 300 through 380, 500, Tables 1 through 9;
10. Signal Systems—Article 800.

The chart on page 105 contains one-line diagrams of an industrial plant distribution system and a reference guide to the National Electrical Code. They cover the high spots in the Code.

Distribution Methods

Certain general principles apply to distribution. Power is supplied usually at low voltage (600 volts and less) to small plants. The load is comparatively centralized, and feeders or branch circuits with circuit protection devices are run direct from the service-entrance panel or switchboard to the machines.

Medium size and large plants usually generate or purchase power at high voltage (over 600 volts, generally at 2,300 or 4,150 volts). The high voltage or primary power is delivered by primary feeders to one or more transformer stations and stepped down to plant operating voltage. Secondary or low voltage (usually 220 or 440 volts) power lines, termed secondary feeders, are run to distribution centers in different departments, to various floors and to outlying buildings.

Transformers are located with respect to the incoming power service and load centers, but inaccessible to unauthorized persons. They can be mounted, depending on size, outdoors on poles or attached to structures, or on suitable bases on the ground and fenced in. For protection from the elements, transformers are placed in detached buildings, or in vaults within one of the plant buildings, or located at load centers in buildings. In the two latter locations, vaults are seldom required if, instead of oil, a "liquid that will not burn" is used in the transformers.

Auto-transformers or small air-cooled transformers are used to obtain 110/220 volts from 440-volt feeders. These may be located conveniently where the power will be used.

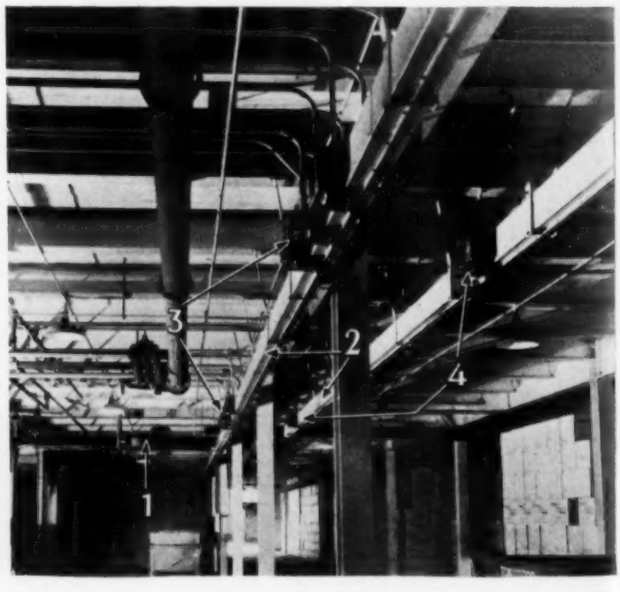
Feeder and Branch Circuits

Primary and secondary feeders may be run underground. (1) by armored cable placed in a trench and trench refilled, (2) in underground raceways with manholes at suitable locations, and (3) by running exposed cables in tunnels, or enclosed in raceways.

Outdoor feeders may be run (1) as pole lines, (2) with spans bracketed between buildings, (3) on roof, supported by trusses or cable towers, (4) in catenary suspended conduit, weather-proof wireways, or busways carried between buildings, and (5) attached along the outside of buildings.

Indoors, the feeder construction can be (1) open-work on insulators, (2) enclosed wiring in conduit or in tubing which may be exposed or concealed in the building structure, (3) metal wireways, (4) underfloor raceways, (5) busways or guarded bare busbar racks, or (6) concentric tubular or polarized tubular bare conductors, as recently developed for heavy welding loads.

Branch circuits are run either indoors or outdoors and their construction can be (1) open-work on insulators, (2) rigid or flexible raceways, (3) armored metallic or non-metallic cables, (4) wireways, (5) plug-in bus systems, (6) trolley bus systems, or (7) heavy-duty portable plug-in systems.



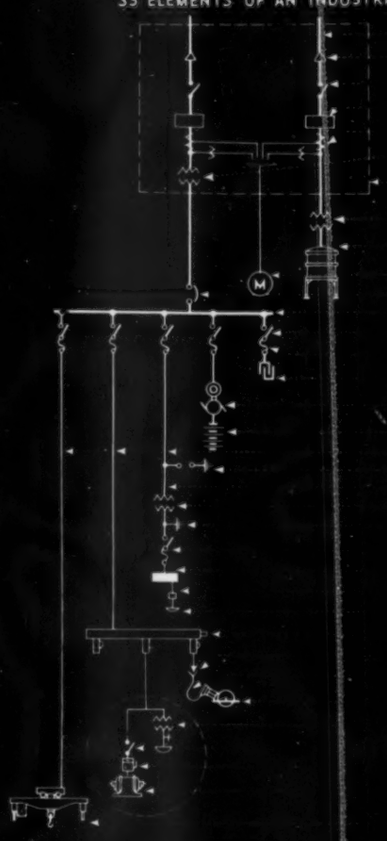
FLEXIBILITY of Bus Distribution—Busbars in ducts serve as feeders (1) and sub-feeders (2). Branch circuit protective devices can be plugged into busbars at conveniently placed outlets, to suit changes in machine capacity with either flexible or rigid wiring may be concentrated as at (3) or de-centralized as at (4). (Bull Dog Electric Products Co. Photo)

Code Reference Chart for

ELECTRICAL DISTRIBUTION SYSTEMS

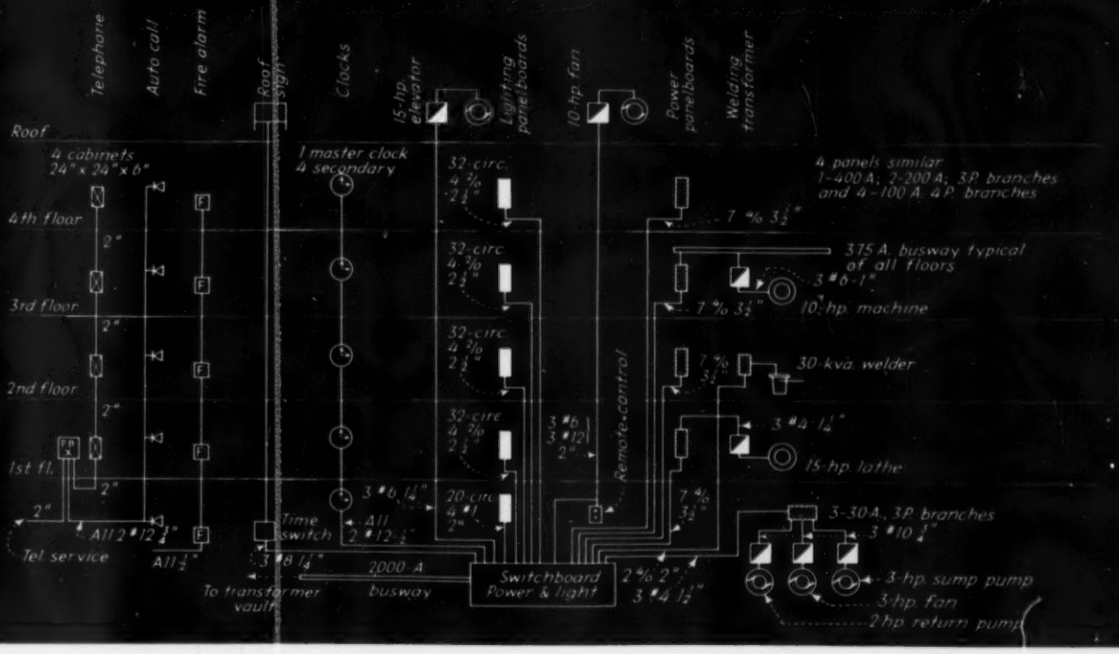
By John M. Turnbull, Electrical Engineer, Springfield, Mass.

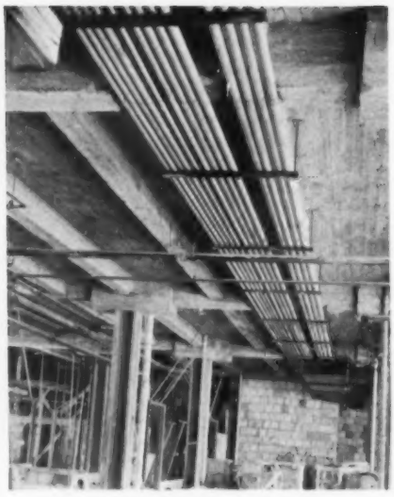
35 ELEMENTS OF AN INDUSTRIAL SYSTEM



	SEE 1937 NATIONAL ELECTRICAL CODE	
Primary cables	Article	710
Potheads	"	710
Disconnecting switches	"	710
Oil circuit breakers	"	710
Transformers, current and potential	"	450
" , high-voltage, oil-filled	"	450
Vaults	"	450
Transformers, high-voltage, filled with liquid that will not burn	"	450
Furnaces	"	750, 750
Meters and Instruments	"	230, 384
Air circuit breakers	"	240
Switchboards	"	384
Switches	"	380
Fuses	"	240
Capacitors (condensers)	"	460
Generators	"	445
Batteries	"	480
Feeders	"	220
Lightning arresters	"	280
Outside wiring between buildings	"	730
Transformers, low voltage	"	450
Grounding	"	250
Safety enclosed switches	"	380
Panelboards	"	384
Lighting branch circuits	"	210
" fixtures	"	410
Busways	"	364
Receptacle, heavy duty	"	210, 422
Flexible cords	"	400
Portable appliances	"	422
Machine lighting transformer	"	450
Motor disconnects	"	430
" controls	"	430
Motors	"	430
Cranes	"	610

PLOTTING THE SYSTEM IN RISER FORM





LONG RUNS—Massed conduits enclosing heavy feeders were installed to meet this building's particular distribution and design problem.

Types of Wiring Systems

Adequate capacity of feeders, branch circuits, and panelboards is essential (1) to avoid the too common practice of operating the system at or near its maximum capacity, (2) to provide for minimum voltage drop, and (3) to allow for plant expansion. Adequate capacity has a definite bearing on efficiency and trouble-free operation, but it is a feature of design that is overlooked too often. When good practice is followed, loads are limited to 50 to 70 per cent of the rated maximum capacity of the conductors.

Some of the comparatively recent developments of enclosures for wire and cable runs are: (1) underfloor ducts providing a built-in system which will be accessible for increase or re-arrangements of branch circuits; (2) wireway, a metal trough with hinged covers, through which wires and cables are threaded, and which can be salvaged if changes are made in the layout; (3) busway, consisting of interconnected sections of metal duct, with enclosed busbars mounted on insulators, a construction which permits it being taken apart and installed again in another location to meet changes in production methods or rearrangement of machinery; (4) trolley duct consisting of copper busbars enclosed in an insulated steel duct.

Feeders and branch circuits are protected against short circuit or very large overloads by fuses or circuit breakers. The code requires both disconnecting means and overcurrent protection at the service entrance and for any reduction in size of conductors. Panelboards with fused switches or circuit breakers are usually employed for the compact control and protection of groups of feeders and branch circuits.

Voltage drop can be kept to a minimum by having circuit runs as short as possible, and by locating the distribution centers close to the actual points of operation. Voltage drop up to the final distribution point, for the sum of the load to be supplied, should be not more than 3 per cent, and on branch circuits not over 2 per cent.

Maintenance

Plant systems require periodic inspections and tests as an important adjunct to normal maintenance and trouble corrective work. If the pressure of repair and alteration routine has continued over a period of several years, then a complete plant survey, covering all parts of the electrical distribution system, is well warranted. By recording all system data, making insulation resistance tests, voltage drop tests and conductor loading tests as a part of such a general survey, the fund of facts thus obtained and recorded will disclose how well the system is holding up and how capable it is to meet future changes and emergency overload burdens.

Do these specific things as a part of your electrical distribution maintenance routine:

1 Test insulation of conductors and transformers.

2 Check oil level in circuit breakers, also for water and sediment in tank. If oil is dirty, renew it,

3 Do the same as (2) for transformers.

4 Inspect contacts on knife switches and circuit breakers.

5 Tighten lugs, fuse clips and links.

6 If heating occurs, check type and capacity of fuse for application, and then against switch and conductor.

7 See that panel doors close and lock.

8 See that conduit and other system enclosures are securely fastened.

9 Check ground connections.

10 Replace temporary runs with permanent conductors.

11 Check signalling devices.

12 Measure voltage drop and power factor.

13 Blow off dust from back of switchboard.

14 Remove foreign objects from distribution panel ledges and from any other parts of the system.

Power Factor

An additional point to be considered in the design and operation of an electrical distribution system is power factor. It may be defined as the ratio of useful power to the total power in an a.c. circuit. In industrial plants and commercial establishments, power factor is usually lagging, and if under 85 per cent is considered low.

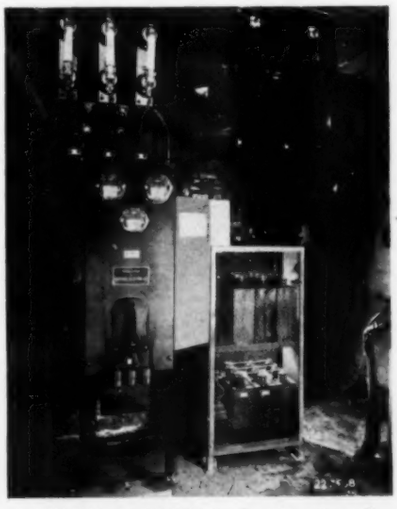
Improvement of power factor is made (1) to reduce reactive or useless power on the circuits, (2) to improve voltage regulation, and (3) to reduce the power bill by reduction in the kva. demand charge, energy charge, or both.

The following methods are used to correct power factor: (1) interchange of motors so that they operate at or near full load; (2) use of higher speed motors, 900 r.p.m. and above; (3) use of synchronous motors on constant speed drives which require 30 hp. or more and operate continuously during working hours; (4) installation of capacitors at individual motors, on feeders, or at the switchboard.

The first three methods should be considered first as they are of primary importance for improvement of power factor and reduction of reactive kva. to a minimum. Afterwards, capacitors may be installed in the most advantageous manner to supply the remaining reactive kva.

Capacitors have no moving parts. When located indoors, they require very little maintenance. Fuses should be tested periodically to determine if they have operated. Insulators should be cleaned occasionally and dust blown off the units. Inspection should be made for leaks of liquid from containers. Outdoor capacitors require repainting, depending on the atmospheric conditions.

Further information on effects, measurement and correction of power factor may be obtained by referring to *Electrical Contracting,* December, 1937 page 37, and September 1938, page 38.



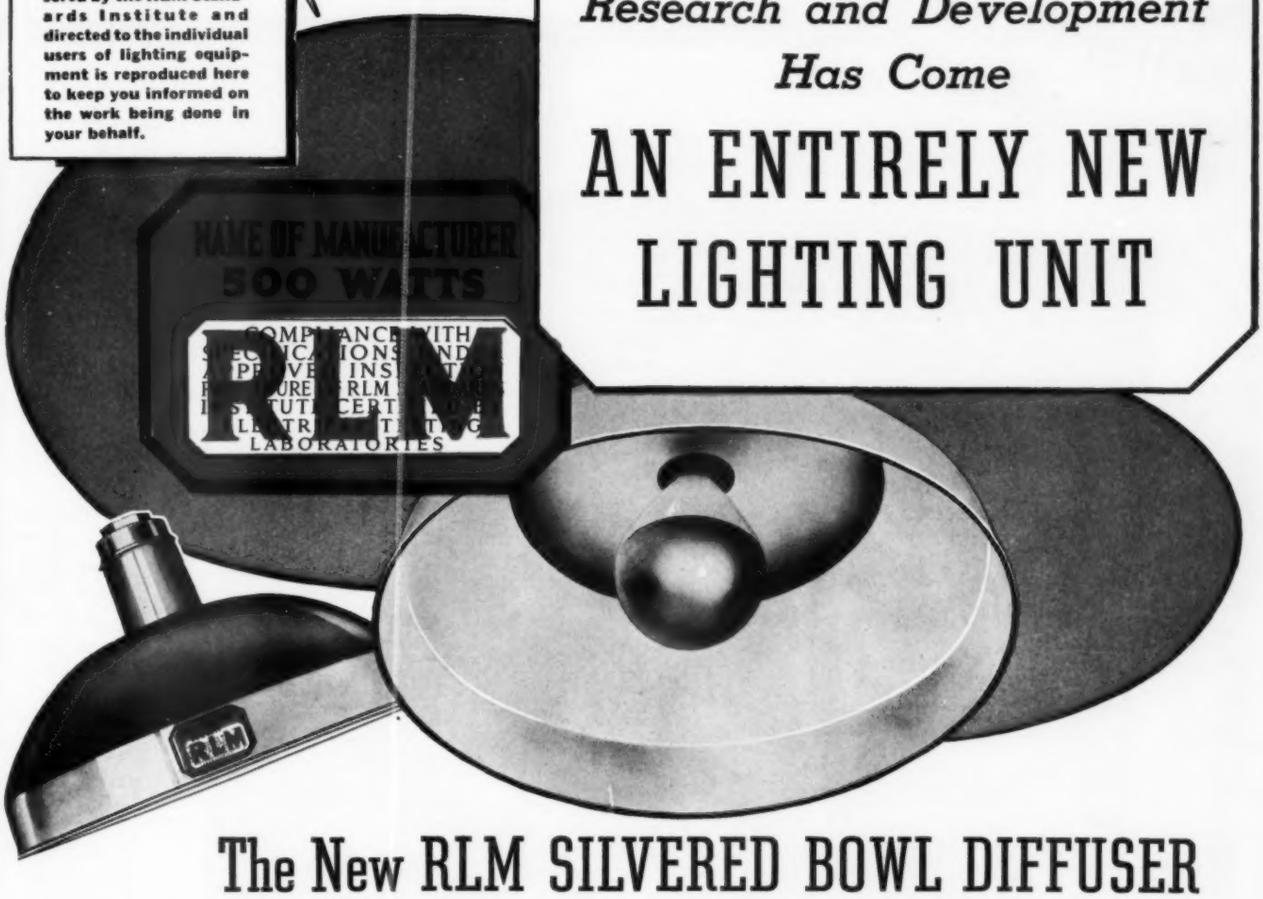
***ANNUAL SAVING** of approximately $2,300 was made for a newspaper plant by this installation of a 66-kva., 4,000-volt capacitor. (Westinghouse Photo)*

ATTENTION
ELECTRICAL CONTRACTORS

Another of the series of advertisements sponsored by the RLM Standards Institute and directed to the individual users of lighting equipment is reproduced here to keep you informed on the work being done in your behalf.

Out of 18 Months of Research and Development Has Come

AN ENTIRELY NEW LIGHTING UNIT



The New RLM SILVERED BOWL DIFFUSER

The new RLM Silvered Bowl Diffuser marks another forward step in the science of Industrial Light Conditioning. Jointly developed by the Mazda Lamp Manufacturers and the members of the RLM STANDARDS INSTITUTE, this new unit is the *first to fully utilize the distinctive indirect lighting properties* of the Silvered Bowl Mazda Lamp and yet retain a high degree of light utilization.

In the RLM Silvered Bowl Diffuser, the only light source visible in the normal field of view is the low brightness portion of the porcelain enamel reflecting surface. The direct light from the lamp itself is shielded from view by its silvered bowl. Thus installations of these units produce a light which is particularly pleasing and comfortable to the eye.

RLM Silvered Bowl Diffusers, attested to by the Electrical Testing Laboratories as conforming to RLM specifications, can be readily identified by the RLM Label. Further information may be secured from your electrical wholesaler or any member of the Institute. Names of members as well as copies of the RLM specifications for RLM SILVERED BOWL DIFFUSERS, RLM DOME, RLM DEEP BOWL and RLM SYMMETRICAL ANGLE REFLECTORS may be had by addressing the Institute.

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

RLM STANDARDS INSTITUTE
INCORPORATED

20 N. WACKER DRIVE · SUITE 1130 · CHICAGO, ILL.

THE CERTIFICATE OF RLM UNIFORM QUALITY

Industrial Wiring
Better Light
Better Sight

Work Both

WHY BOTHER TO

INDUSTRIAL ANALYZER IN USE

Photo courtesy Westinghouse Electric and Mfg. Co.

Mill boosts profit $4,800 annually by $2,600 expenditure

A mill in Georgia, built under the direction of competent engineers, was considered a most model plant, but through the years additions and changes were required to take care of increased production. Yet the wiring installation remained unchanged except for additional circuits necessary to operate new machinery.

Recently a firm of electrical contractors was called in to survey the various departments. Based on this survey, recommendations were made to the management for a complete new distribution system costing $2600. The results were a 9% increase in production, which meant an increase in profit of approximately $4800 a year with no increase in operating costs.

Such surveys usually reveal many conditions that should be corrected. Why not make a similar investigation in your plant?

USE MODERN IMPROVED **Anaconda Wire**

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York
Subsidiary of Anaconda Copper Mining Company

Typical ad in Anaconda's national advertising program on "Modernize industrial wiring."

TURN

—but you stop
too? Anti ized
...lead to owns.

OF COURSE you
not needed... but
ping *invisible* electrical
invisible waste of elec
The waste is due to an
ing which permits cu

In the Industrial P
form of heat losses
Frequent breakdowns
Voltage drops that re
another. *Nine out of*
being penalized becau
wiring! In the comm
losses occur. New ele
overload on circuits.

A check-up

A wiring survey will
save you many dol
directions. The boo
used by hundreds of
today. Your electrical
or electrical contract

If you have a spe
our Engineering D
without obligation.
the many improvem
by Anaconda.

& Ca

Chicago Office: 20 North
Sales Offices in Principal

USE MODERN IMPROVED Anaconda Wire

ANACONDA WIRE & CABLE CO., General Offices: 25 Broadway, Ne
Subsidiary of Anaconda Copper Mining

fields

Here's a case that shows how the Better Light-Better Sight program and Anaconda's industrial program dovetail together

LIGHTS?
stop invisible electrical leaks,
sized circuits squander current
owns. Here's how to stop them
Anaconda
Varnished
Cambric
Cable
A proved favorite in industry
No other one design of cable compares with Anaconda Varnished Cambric for general use in industry, mines, power plants, and large buildings. Simplicity of installation and jointing makes it of universal use.
Particularly where numerous short runs, joints and sharp bends are necessary, this cable is ideal for power requirements. It is also widely used for generator and transformer leads, vertical risers, and mine shafts.
Write for 36-page booklet telling all about Anaconda Varnished Cambric Cable
Use these free books to end power and lighting "headaches"
The "Industrial Wiring Survey" tells how to make a check-up of electrical circuits. The "Industrial Guide for the Selection of Wire and Cable" tells how to correct conditions found. Both books are FREE!
Industrial Wiring Survey
Industrial Guide

ONE bay of a certain industrial plant was lighted with 500 watt lamps and another bay with 300 watt lamps. Because of undersized copper and consequent "pull", the light delivered was approximately the same in both. Naturally, the customer complained.

Result: A Wiring Survey was made and this led to a rewiring job. The plant standardized on 500 watt lamps and everybody was happy with the result.

Moral: It pays the contractor and wholesaler—to work BOTH the power and light fields with the aid of the sales material now available. The Better Light—Better Sight program and Anaconda's industrial rewiring program fit together perfectly. Anaconda *national campaign* is at work interesting your industrial customers in wiring surveys. Send the coupon for full information about how you can cash in on this program.

38422

ANACONDA
from mine to consumer

Use these books in discussing rewiring with industrial customers. The "Survey" tells how to make a check-up of factory circuits. The "Guide" tells what to do to correct the conditions found. Both books are FREE.

ANACONDA WIRE & CABLE COMPANY
25 BROADWAY, NEW YORK CITY

Please send details of your industrial wiring promotion plans. Include copies of books. (Cross out if you already have these.)

*Name*_____

*Street*_____

*City*_____ *State*_____

Wire & Cable

Office: 20 North Wacker Drive

Offices in Principal Cities

TAKE THIS *Valuable Tip* FROM THE BOYS WHO KNOW

★ The boys who use this service will tell you that it's dependable, that it's prompt, that it assures you of quality products, that it's time saving, and that it pays in many ways—it is smart business to follow this tip—the list of Insulation Incorporated customers is growing rapidly, which means satisfaction—if you haven't an Insulation Incorporated Catalog send for one today, then use it—place a trial order and you too will be glad to pass the good word along.

Use our catalog

Listed in our Catalog are the high quality, well - known Krout & Fite Mfg. Co. products — Cotton Tape (Linen Finish), Cotton Webbing, Stay Binding, Silk Tape. Turn to the Cotton Sleeving section of our catalog and see The R. T. Pearce Company products featured—this Cotton Sleeving is made from the best grade of yarn. Refer to page 4 of our catalog for your Motor Lead Wire needs — products of Paranite Wire and Cable Corporation—the assurance of dependability.

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Headquarters

One Source of Supply for Wire and Insulating Materials

Quality - Dependability - Service

INSULATION INCORPORATED 2127 PINE ST., ST. LOUIS, MO.

IT'S NEW! *The Ward Leonard Manual Motor Starter Switch With Overload Protection . . . . .*

Featuring

Push Button operation with indented cover to prevent accidental contact.

Butt contacts: No looseness from wear as in a knife switch.

Send for Bulletin No. 2851

WARD LEONARD

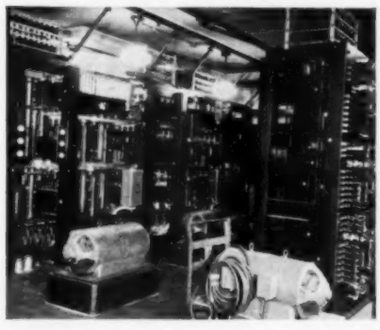
28 SOUTH STREET, MOUNT VERNON, N. Y.

Electric Control Devices Since 1892

Spare Nerves for News Presses

Keeping delicate controls functioning for mammoth presses requires extra precautions in New York City's Daily News plants. Here 1¾ million editions of weekday papers and 3,150,000 copies of the Sunday editions are produced.

This rear view of two press control boards shows also a row of field-controlled motor-generator sets used for energizing the net-work of delicate



RESERVE ENERGY—Spare dolley-mounted m-g set is kept available for quick emergency service should huge news presses become paralyzea.

controls. Just in case m-g trouble occurs, there is a spare unit on a dolley or truck (in foreground) which can be quickly plugged in to replace a "cripple". These motor-generators have an 8-hp. motor built integral with a 5-kw. generator. The rubber-jacketed connecting cables are shown coiled alongside the frame.

Neon Signs and Radio Reception

Neon signs, like other electrical equipment, require regular inspection and servicing. The few complaints from radio users may be due to troublesome operation of the signs. If properly designed and maintained, neon signs should not cause any interference for radio reception.

Quantitative measurement tests conducted by engineers of Aerovox Corp., Brooklyn, has resulted in the following conclusions:

1. Very little, if any, radio interference results from "kick" through a.c. line.
2. All interference is caused by radiation from neon tubing.
3. If metal case and frame of the neon sign are not grounded, the whole unit radiates interference signals.
4. Field strength of interference signals drops off very sharply with distance from the sign—practicaly zero at 6 ft. from sign.
5. Radio frequency chokes or condensers on high-voltage side increase interference.
6. Interference increases with faulty connections, dirty insulators and tubing.

7. Reduce interference by (a) cleaning dirty tube, and (b) grounding center point of tube. Wrap a small piece of foil at that point and connect it to frame of sign.

8. Worn out or dirty tubes may cause an interference voltage to be transferred to a.c. line. Under such conditions a filter should be used.

9. Keep receiving antenna as remote as possible from neon sign. For best results use some form of doublet antenna with twisted-pair or screened downlead.

10. Keep antenna downlead as far from neon signs as possible.

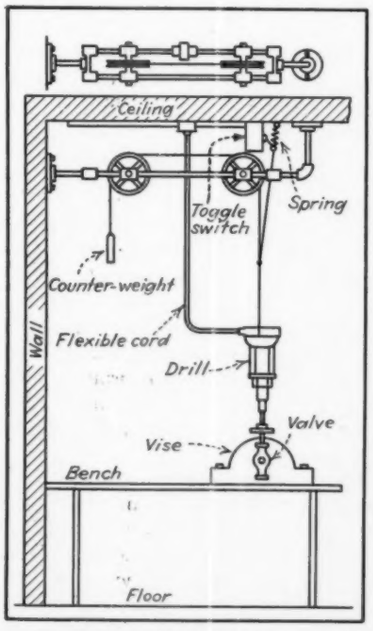
Less Handling Less Maintenance

By suspending a portable electric drill and arranging for its automatic operation, an eastern valve manufacturer has reduced handling time of the drill and maintenance of its switch.

The drill and a socket wrench are used to tighten hexagon nuts on valve stems which hold the wheels for opening and closing valves. About 1,000 valves are assembled during one working day, and are held in an air-operated vise.

Previously, the drill was handled many times—being picked up from the assembly bench, applied to tightening the hexagon nuts, switched on and off by hand, and returned to the bench. The switch on the drill frequently developed trouble because of the handdling.

A pipe frame and pulley were mounted on the ceiling so that the drill could be suspended over the vise. For automatically starting and stopping of the



SUSPENDED TOOL for assembly work, fastening nuts on valve stems, saves handling time and reduces maintenance of built-in switch.

Automatic control of pumps for domestic water supply — automatic fire pump control to maintain pressure in the hose lines— this panel combines both of these. Indicating instruments, with visible and audible alarms are also mounted on this panel, thus indicating at all times the water supply in the tanks. All these features combined on one panel, manufactured, tested, installed and operated as a unit, assures correct interconnection of various parts to insure a constant water supply and fire protection.

"CLARK 3C" RHEOSTATS • "3C" BRAKES
"3C" A. C. STARTERS • "3C" CONTACTORS
"3C" EDGEWOUND RESISTORS • "3C" D. C. STARTERS • CRANE CONTROLLERS • CRANE PROTECTIVE PANELS • BATTERY CHARGING PANELS • AUXILIARY ELECTRICAL EQUIPMENT.

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1146 EAST 152nd STREET • CLEVELAND, OHIO

UNCONDITIONAL GUARANTEE
If this Housing ever Breaks or Distorts we will replace it Free.
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RIGID
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PAT. NO. 1727623

Quit Wasting Time and Money on Pipe Wrench Repairs

The Guaranteed RIGID Housing keeps this Wrench on the job . . . doing better work

Millions of RIGID wrenches in use under that housing guarantee—and the users will tell you they stay on the job, avoiding nuisance of repairs, saving you money. You enjoy using the safe all-alloy RIGID with replaceable chrome molybdenum jaws, adjusting nut that never binds even in 60" size, powerful I-beam comfort-grip handle.

It's a tool that inspires workmanlike pride and care. For economy and efficiency, buy RIGIDs—at your Supply House.

The Ridge Tool Co., Elyria, Ohio

RIGID PIPE TOOLS

Completely finished Bunting Quality Bearings for all makes of motors from 1/50 hp to 100 hp are instantly available from stock—ready for immediate assembly.

BUNTING'S new, enlarged catalog is now ready. . . On every page you will find many opportunities to save time, trouble and money in all your bearing requirements. Write for your copy... The Bunting Brass & Bronze Company, Toledo, Ohio. Warehouses in All Principal Cities.

BUNTING Quality

BRONZE BUSHINGS • BEARINGS
MACHINED AND CENTERED BRONZE BARS
BABBITT METALS

drill, a 6-amp., 125-volt toggle switch was mounted in an iron box which was also fastened to the ceiling.

One end of a spiral steel spring and of a fine steel piano wire were inserted in a hole in a metal ball on the switch handle. The other end of the spring was fastened to the ceiling. The other end of the piano wire was fastened to the cable which suspends the drill. Thus when the drill is lowered to tighten the nut, the switch is closed, and when the drill is raised, the switch is opened by the contraction of the spring. The switch was mounted to the lower part of the switch plate to insure that the steel spring would return the toggle switch to the normally open position.

Parts for the pipe-frame rigging, as shown in the sketch, consist of six ½-in. tees, four elbows, one ½-in. union, two 3-in. flanges, and ½-in. pipe nipples.

The frame supports two 4-in. sheet metal pulleys bushed with ¼-in. brass pipe which serves as a bearing to the ⅜-in. brass-pipe shafts. The shafts pass through the ½-in. tees, are threaded at each end and fastened with locknuts. A ¼-in. flexible steel rope rides on the pulleys, one end being fastened to the 4-lb. drill and the other end to a 4-lb. sash weight.

The drill is connected by a flexible cable to an outlet box on the ceiling, and also in series with the switch.

Signalling Relays

There are so many different types of relays used in signalling that there are many points to be checked to insure successful operation. The fact that many systems carry a very small load is often used as an excuse for installing inefficient relays.

On open-circuit work, the service is intermittent and the windings of such relays are of comparatively low resistances, in line with the voltage on the system. For closed-circuit work, the service is continuous while the circuit is operative and therefore, the windings must be of higher resistance. But even in open-circuit systems, relays should be selected with proper windings, which will not "burn out" in the event the circuit is closed a little longer than usual.

Sometimes these windings "burn out" when push buttons or other contacts "stick" or break. In closed circuit systems, relays should be selected with economical and efficient windings that will only consume a very small amount of current and will not overheat.

All relays should have some good contacting metal at the point of contact, and should be of ample cross-section to

carry the load of the signalling circuit. The contact springs and the contact points must be larger, wherever the circuits contain an inductive load. In addition, the air gap should be greater and the "break" should be quicker on inductive loads than on non-inductive loads. Also d.c. loads will require larger contacts than a.c. loads at equal voltages.

Overloading circuits will cause arcing at the contacts of the relay. It is best to check the contacts at frequent intervals and, if necessary, to sandpaper them to obtain a clean surface and a good electrical contact. All movable parts of relays should be examined at frequent intervals to insure ease of movement and decrease in arcing at contacts.

Relays should be mounted as recommended by the manufacturers. Occasionally relays are improperly mounted and contacts will not open or close as quickly as they should. That causes excessive arcing.

BUILT-IN MOTOR PROTECTION

By J. V. Hunt

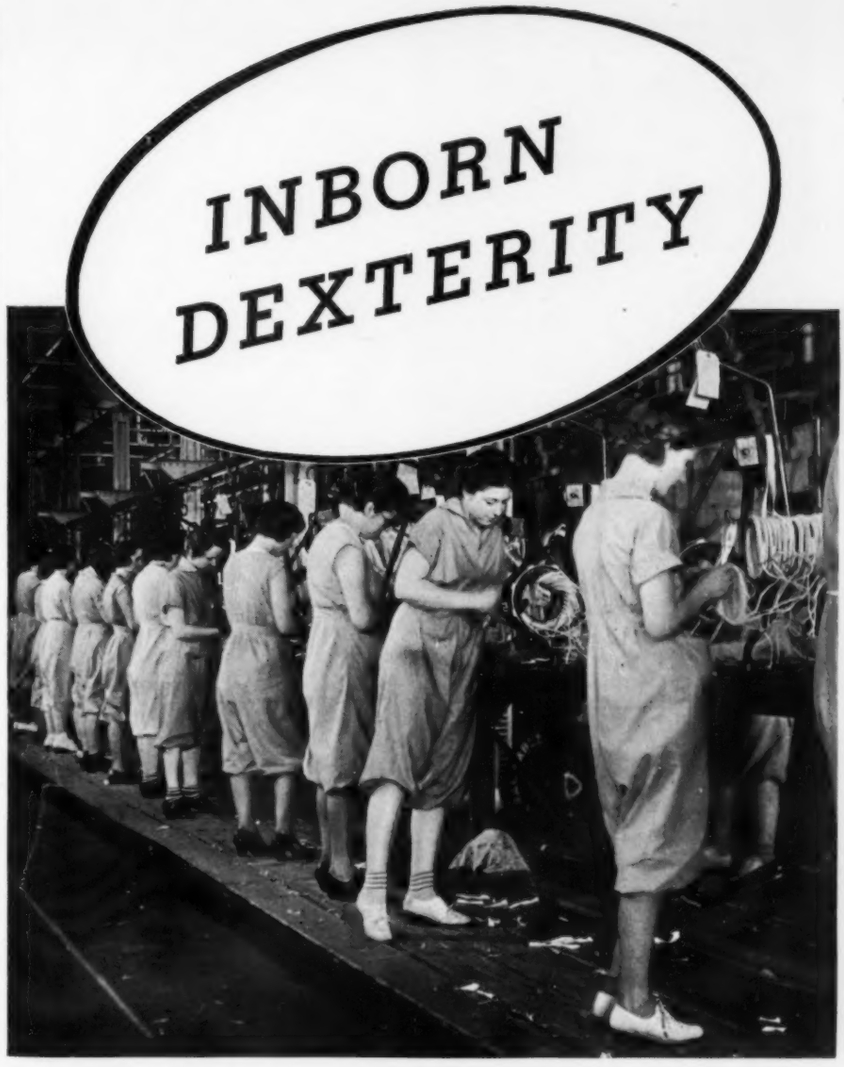
Motor Division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Many motors must go through severe duty cycles. In a sugar centrifugal, for example, this operation calls for rapid acceleration and frequent repetition of the cycle.

The only known way to take care of such conditions thoroughly is with the use of some temperature-registering device mounted directly on the motor. A separate relay that might be used on a control would have to be set high enough to take care of the peak load during acceleration. Such a relay does not register the true conditions that may be going on inside the motor. The more often the cycle is repeated, the hotter a motor becomes. Such a device, the thermoguard, is actuated by the heat of the motor itself, and the power is automatically disconnected before a dangerous temperature is reached.

In driving a sugar centrifugal, each rapid duty cycle imposes a peak load. When these peaks occur too often, a motor may heat excessively. That is what happened to a group of two-speed motors in a southern sugar mill. The motors had operated successfully through the winter season, but when warmer weather came, several of them burned out.

The operator suffered a loss caused by the expense of rewinding his motors with heat-resisting materials (Class B



ASSEMBLING the coils in the stators of Fairbanks-Morse motors is most satisfactorily performed by woman's nimble fingers. Under their deft touch each turn of wire, each piece of insulating material finds its exact place. Woman's inborn dexterity provides speed with accuracy.

Every operation on *every* Fairbanks-Morse motor must measure up to precision standards. Striving for perfection in *every detail* in our plant means better and longer service in yours. Write Department 24, Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill. 35 branches at your service throughout the United States.

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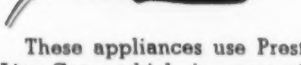
WATER SYSTEMS
REFRIGERATORS
RADIOS
WASHERS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS

F M Motors

FOR PROFITS IN
WIRING
CONTRACTS

PREST-O-LITE
TORCHES and SOLDERING IRONS

These torches and soldering irons supply proper heat for neat, rapid, economical installation of wire and cable. The torches, for open-flame work, produce instantly a concentrated, exactly controlled flame of high temperature. The soldering irons, for enclosed-flame work, can be kept constantly at a desired heat.



These appliances use Prest-O-Lite Gas—which is convenient, economical, and obtainable at thousands of Prest-O-Lite Gas Exchange Service Stations.

Your jobber will demonstrate Prest-O-Lite Torches and Soldering Irons. Call him—or write the Linde office near you.

The word "Prest-O-Lite" used herein is a registered trade-mark.

THE LINDE AIR PRODUCTS COMPANY
Unit of
Union Carbide and Carbon Corporation
New York and UCC Principal Cities
In Canada:
Dominion Oxygen Co., Limited, Toronto

insulation). On top of all this, the insurance company became uneasy, wanted protection against what it considered a fire hazard, and insisted that the motors be equipped with suitable thermostatic devices.

In textile mills, where motors clogged with lint are a determining factor, several large sized mills have every motor equipped with thermoguards as an additional protection.

For multi-speed squirrel cage motors a simple solution is to equip the motor with built-in protection. It simplifies the control, making separate relays unnecessary. Protection is provided automatically against overheating regardless of the winding used and the speed at which the motor may be operated.

Where high peak intermittent loads are encountered, such as on hydraulic

BUILT-IN-WATCHMAN — Heat within the motor actuates the thermoguard, causing it to flash a light or shut off the motor when the temperature reaches the danger point. (Westinghouse Photo)

shaper planers, the motor is protected from the high peak loads, no matter how often they occur.

Also, large synchronous motors are given built-in machine protection against excessive damper winding heating which results from a stalled condition or from prolonged operation as a squirrel cage motor. The temperature-registering device is a valuable adjunct to other external protective relays.

Sometimes two motors are tied together so that they will operate at exactly the same speed. What is known as a synchro-tie equipment has been used for this service. Quite often the duty cycle includes operation at very slow speed. At such times the motor will have practically no ventilation from its rotor fan. The thermoguard has been found to be satisfactory for protection against this condition.

Many other interesting installations are being made and the indications are that built-in motor protection is increasing in popularity with the maintenance engineer.

FILL ALL YOUR COMMUTATOR NEEDS . . .

Easily, quickly and dependably from these

EIGHT CONVENIENT SOURCES OF SUPPLY!

Regardless of your location or requirements, Homer can give you the commutator service you're looking for. Designed by experienced commutator engineers and stocked in eight key cities, you are assured complete satisfaction and speedy delivery.

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- PHILADELPHIA, PA.— Electrical Maintenance Equipment Company
- DETROIT, MICH.— Universal Electric Prods. Co.
- CHICAGO, ILL.— Reading Electric Co., Inc.
- ST. LOUIS, MO.— Insulation, Inc.
- LOS ANGELES, CALIF.— Tri-State Supply Corp.
- TORONTO, CAN.— D. M. Fraser, Ltd.
- CLEVELAND:

HOMER COMMUTATOR CORP. 4747 Hough Ave. Cleveland, Ohio

TELESCOPE BM SYSTEM
CONNECTORS and COUPLINGS

inexpensive . . . simple easy installations . . .

Strong, dependable installation can be made quickly and economically with B-M Connectors and Couplings. Contractors find them indispensable because of the satisfactory results and good looking jobs made possible by this simple method.
Our tools and method of fastening the fittings to the tubing are patented, and we therefore, limit the license of our tools under our patents to the installation of our fittings only.

BRIEGEL METHOD TOOL CO.
(not incorporated)
Galva, Illinois

B-M Indenter (600) is the only tool necessary to make perfect installations. Interchangeable jaws for ½", ¾", and 1" fittings. Holder and cutter are available though vises and hack saws can be used.

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2. Bulletin GEA-2791A describes and illustrates thyratron resistance welder controls. Applications and specifications data included. General Electric Co.

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3. A 64 page bulletin No. 1022, illustrating outlet and switch boxes, conduit fittings, etc. Has ten sections with tab index for ready reference. Appleton Electric Co.

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4. A 12 page booklet describes and illustrates new types of current and potential transformers, and meter boxes. Westinghouse Electric & Mfg. Co.

TIME SWITCHES
5. A leaflet listing a line of "Automatic" time switches and flashers. Applications, specifications, and prices are given. Automatic Electric Manufacturing Co.

SOFT BALL LIGHTING
6. A 32-page manual on flood lighting soft ball fields for night play. Complete information for design, layout, and installation for various types of fields is given. Benjamin Electric Manufacturing Co.

PIPE BENDERS
7. A folder illustrating and describing the "Porto-Power" pipe bender. A variety of uses is illustrated and a list of accessories included. Blackhawk Mfg. Co.

TOOLS
8. A new illustrated catalog featuring a line of hand operated cutters for industrial, farm and forest use. H. K. Porter, Inc.

COMBINATION METERS
9. Leaflet 42-770 describing and illustrating combination watt-hour meters and time switches for special metering application. Gives construction details, dimensions, wiring diagrams, and list prices. Westinghouse Electric & Mfg. Co.

OPEN KNIFE SWITCHES
10. Bulletin 400, a complete listing of open knife switches, fuse blocks and cutouts with list prices and dimensions. Trumbull Electric Mfg. Co.

BI-POST FIXTURES
11. Catalog folders featuring fixtures designed for use with bi-post lamps, Ivanhoe "Cavalier" and "Helmet", and Duplexalite D1118 and D1124. The Miller Co.

BRAKE-MOTORS
12. A bulletin on characteristics, construction features and applications of the General Electric brake-motor. GEA-2026A. General Electric Co.

SWITCH GEAR
13. Bulletin 1145 B entitled "Metal Clad Switch Gear" for power stations, sub stations and general industrial purposes. Design features, dimensions, and wiring diagrams are shown. Allis-Chalmers Manufacturing Co.

TROLLEY DUCT
14. A 12 page bulletin describing "Trol-E-Duct" and illustrating its application in industrial buildings. Bull Dog Electric Products Co.

LOCAL LIGHTING
15. A "Handbook of Localized Lighting" describes and illustrates the application of supplementary lighting in industry. Specifications and distribution charts. The Fostoria Pressed Steel Corp.

PORCELAIN CATALOG
16. Catalog No. 15, consisting of 52 pages of description and illustrations of standard electrical porcelain, radio insulators, Neon housings and bushings, porcelets, electric fence insulators, pole line hardware, high voltage insulators, hi-line hardware and distribution cutouts. Porcelain Products, Inc.

BLACK LIGHT
17. Bulletins 14 and 15, describing and illustrating projectors for energizing luminous preparations with near ultra-violet or "black" light. Black-Ray Lighting Co.

VOLTAGE STABILIZER
18. A bulletin describing the "Raytheon" voltage regulator and its application. Complete engineering data, dimensions, and price list is given. Raytheon Manufacturing Co.

RECESSED FIXTURES
19. A catalog "Recessed Lighting Equipment" describes and illustrates a complete line of recessed lighting units and accessories. Includes installation and dimension data. Curtis Lighting, Inc.

CONDUIT FITTINGS
20. Catalog G 151 of trade cost prices on conduit and EMT fittings, box connectors, switch plates and box covers. Conduit Fittings Corp.

ARC WELDERS
21. A descriptive bulletin, GEA-1750 D discusses profitable application of alternating current welding equipment. Advantages, features, auxiliary control devices and ratings of welding sets are given. General Electric Co.

AIR BREAKERS
22. A 12-page booklet, 33–675, describing and illustrating type U De-ion air circuit breakers, for indoor service. Design features, specifications and complete dimension data given. Westinghouse Electric & Manufacturing Co.

KITCHEN FIXTURES
23. A catalog sheet illustrating and describing recessed kitchen fixtures for residential use. Day-Brite Lighting, Inc.

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330 West 42nd Street
30th Floor **New York, N. Y.**

WIRING DEVICES
24. Catalog No. 1 outlining detailed information and price lists on ground clamps, U bolts, ground bushings, reducing adapters, reducing bushings, offset nipples, spreaders, sockets, adapter boxes, and meter fittings. B. Hartman.

LARGE MOTORS
25. Bulletin 1156A illustrates and describes applications of large polyophase induction motors for general industrial service and for hoist and steel mill service. Allis-Chalmers Mfg. Co.

LIGHTING AND WIRING
26. Catalog No. 18 illustrates and describes the Multi line of lighting equipment and wiring devices. Price list included. Multi-Electrical Mfg. Co.

PULLEYS
27. A catalog listing pulleys and flexible couplings. List prices and application data included. The Congress Tool and Die Co., Inc.

PARTS CATALOG
28. Catalog No. 53 giving illustrations and price list of motor, fan, controller, drink mixer parts. Also magnet wire, varnish, insulating materials, winding supplies and tools. Reading Electric Co., Inc.

COMMUTATOR TOOLS
29. A leaflet illustrating and describing the use of commutator resurfacing grinders, brush seaters, undercutters and other commutator tools. Ideal Commutator Dresser Co.

FUSES
30. Condensed catalog CPF-300 covers the Trico line of fuses, clamps, fuse pullers, automatic lubricators and accessories. List prices are given. Trico Fuse Manufacturing Co.

INDUSTRIAL LIGHTING
31. A buyer's guide entitled "The Meaning of the RLM Label" outlining the principles of modern industrial light conditioning. Discusses factors in industrial lighting and basic standards of efficiency, design and quality of lighting reflectors bearing the RLM label. RLM Standards Institute.

DRILL
32. Folder illustrating and describing portable ceramic drill, a precision tool for drilling all ceramics regardless of hardness. Portable Appliances, Inc.

ULTRA-VIOLET OUTFIT
33. Bulletin No. 112 featuring the Uviarc portable a.c. ultra-violet outfit. Lists complete technical data concerning the lamp. Discusses operating characteristics, gives a general specifications and diagram. General Electric Vapor Lamp Co.

STOCKBIN LIGHTING
34. Bulletin 91, "Light on the Subject of Stockbin Illumination" describes and illustrates the illumination of shelves and bins in narrow aisles, featuring the "Stocklite". Goodrich Electric Company.

RURAL TRANSFORMERS
35. A twelve-page illustrative booklet describing the features of "CST" transformers for rural service. Self-protection, installation, and maintenance features are illustrated and described. Westinghouse Electric & Manufacturing Co.

FANS
36. A pocket catalog of 24 pages listing desk fans, air circulators, ceiling fans, exhaust and ventilating fans. Mechanical features, performance data and prices included. Emerson Electric Mfg. Co.

ENCLOSED MOTORS
37. Bulletin 142 features the Sterling "Klosd" motor. Includes illustrations of application and construction features. Sterling Electric Motors, Inc.

LIGHTING UNIT
38. A bulletin describing the "Orthoplane" lighting unit, giving construction features and light distribution data. United Cinephone Corp.

VIBRATION CONTROL
39. A paper entitled "Theory of Vibration Control". Treatise covers the subject of machinery vibration transmission and elimination, from theoretical and practical standpoints. Illustrated with photographs, drawings and sketches. The Korfund Co.

TESTING METERS
40. A leaflet illustrating and describing the "Hickok Jumbo" volt-ohm-milliameter. Applications and range of operation data given. The Hickok Electrical Instrument Co.

JACKHAMERS
41. A bulletin illustrating and describing a series of compressed air operated jackhamers and accessories. Design features and a table of drill specifications included. Ingersoll Rand Co.

SWITCHES
42. Catalog No. 9 describing Type R-2 rotary switches for instrument and control use. Includes illustrations and diagrams. Roller-Smith Co.

LINE STARTERS
43. Leaflet 11-200 illustrates and describes "De-ion" non-reversing line starters. Specifications, dimensions, and prices are given. Westinghouse Electric & Manufacturing Co.

SWITCHBOARD
44. Bulletin GEA-2892 illustrates a number of duplex switchboards with secondary control and protective equipment. General Electric Co.

WINDOW LIGHTING
45. A catalog describing and illustrating the "Hi-Light" line of window reflectors, spotlights, floodlights, recessed store lights and accessories. J. Chesler & Sons Co.

WELDERS
46. A folder illustrating and describing butt welders, flash arc and seam welders and pedestal mounted spot welders. Eisler Engineering Co.

FUSES
47. Bulletin 381-F listing fuses, links and cutout bases and bulletin 381-FA describing and illustrating "Fustats". Application data and operating characteristics included. Jefferson Electric Co.

COMMERCIAL LIGHTING
48. A spiral bound sales presentation book featuring the "Correctalite" Holophane Company.

WINDING SUPPLIES
49. Catalog B lists magnet wire, insulating paper, mica products, and many other supplies for the motor repair shop. Insulation Inc.

AIR CIRCULATORS
50. A leaflet illustrating and describing "Deflecto" air recirculators. A variety of ceiling types including lighting fixture combinations is shown. Kisco Co., Inc.

FLOOD LIGHTING
51. Bulletin GEA 2943 describes "Novalux" mercury-incandescent flood lighting for used car lots. Flood light locations, wiring diagrams and installation details included. General Electric Co.

DOOR CHIMES
52. Catalog sheets on electric door chimes. A variety of tubular and bar types are illustrated and described. List prices are given. Edwards & Co.

ATTIC VENTILATORS
53. Circular 38–1 describes and illustrates "Health-Aire" attic ventilators. List of advantages, installation methods, and specifications. Johnson Fan & Blower Corp.

WIRING MATERIALS
54. Price book listing box connectors, conduit fittings, outlet boxes, covers, bar hangers, and wiring devices. Midwest Electric Mfg. Co.

SOCKET INSTRUMENTS
55. A 20-page booklet describing and illustrating installations, application and economies of "plug in" instruments for industrial analysis. A complete line of portable and switchboard types is also shown. Westinghouse Electric and Manufacturing Co.

SYNCHRONOUS MOTORS
56. Bulletin 1165-A features bracket-bearing type synchronous motors for direct-connected or belted application. Includes formulas and data for power factor improvement. Allis-Chalmers Mfg. Co.

(*Continued on page 117*)

CIRCLE NUMBERS—SIGN—AND MAIL

ELECTRICAL CONTRACTING **October**

(Not good after December 1)

Please send me without obligation, manufacturers' literature herein described and identified by numbers circled below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96									

NAME..... TITLE.....

COMPANY .....

ADDRESS .....

CITY..... STATE.....

LIGHTING EQUIPMENT

57. Catalog 16 covering floodlights, wiring channel, recessed lighting, three-lite units, show window reflectors and related products. Wilson Lighting Inc.

TIME DELAY RELAYS

58. Bulletin 351, describing three types of Thermal Time Delay Relays Contact diagrams and dimensions are given. Ward Leonard Electric Co.

CAPACITOR CALCULATOR

59. Revolving disc calculator for finding power factor and capacity in microfarads, of 110 volt capacitors. Test circuits and formulas for determining capacity and power factor are provided on reverse side of chart. Cornell-Dubilier Elec. Corp.

MONEL METAL

60. A brochure entitled "New Life for Old Equipment" illustrates and describes monel gaskets and pump parts. A list of free booklets and technical bulletins on the use of monel metal included. The International Nickel Co. Inc.

RECESSED UNITS

61. A folder illustrating and describing a variety of recessed and semi-recessed lighting fixtures. Dimensions and prices are shown. Garden City Plating & Mfg. Co.

ELECTRIC HEATERS

62. Bulletin 38-A, featuring "Electromode" electric unit heaters for commercial and industrial use. Includes specifications, drawings and other data. American Foundry Equipment Co.

VOLTAGE TRANSFORMERS

63. Leaflet 43–131 describing and illustrating portable voltage transformers for use with Westinghouse portable instruments and recorders. Specification data and price list shown. Westinghouse Electric & Manufacturing Co.

OFFICE LIGHTING

64. A booklet entitled "Recommendations for Office Lighting" features the "Commodore" series of plaskon reflectors. Many types of installations are illustrated. The F. W. Wakefield Brass Co.

SLIP RING MOTORS

65. Bulletin M 2 describes the "P & H" convertible slip ring motor. Line drawings and photographs illustrate features of design and manufacture. Harnischfeger Corp.

ATTIC FANS

66. A dealers' manual featuring the "CirCOOLator" attic fan. Temperature charts, application, estimating and detailed installation data included. Viking Air Conditioning Corp.

CONTROLLERS

67. Bulletin GEA-1724A describes the construction and operation of controllers for synchronous motors. Wiring diagram and details of operation included. General Electric Co.

CONDUIT FITTINGS

68. Catalog 502 lists the complete line of "Simplet" malleable iron conduit fittings, fixtures, hangers, vapor-light fixtures, plugs and receptacles. Simplet Electric Co.

INDUSTRIAL SWITCH

69. A leaflet describing and illustrating the Trumbull type RBA heavy duty industrial switch. Construction details, dimensions and specifications are given. The Trumbull Electric Mfg. Co.

INSULATING MATERIAL

70. A bulletin featuring "Fiber Glass" describes mechanical and electrical characteristics of insulation made from flexible glass fibers. Mitchell-Rand Insulation Co.

FIXTURES

71. Catalog 39 illustrating and describing the Moe Brothers' line of residential and commercial lighting fixtures. Illustrations in color and price list on a separate sheet. Moe Brothers Mfg. Co.

INDUCTION MOTORS

72. A bulletin featuring Burke type N induction motors. A variety of motor styles and construction features is described and illustrated. Burke Electric Co.

PANEL INSTRUMENTS

73. Catalog Section 43–370, illustrates and describes a line of panel instruments for industrial and radio application. Includes construction details, applications, mounting dimensions, wiring diagrams and prices. Westinghouse Electric & Mfg. Co.

RESISTANCE UNITS

74. A catalog of "Ohmite" rheostat and resistance units for industrial, radio and electronic uses. Lists and describes control rheostats, resistors, tap switches and many other similar items. Ohmite Manufacturing Co.

LIGHT CONTROL

75. A bulletin on photo electric relays for automatic light control, GEA–2679 A, illustrates and describes advantages and operations of automatic light controllers. A page devoted to interesting facts about light and vision. General Electric Co.

ELECTRIC PLANTS

76. A bulletin featuring gasoline-driven a.c. generating plants. Complete mechanical details and specifications included. D. W. Onan & Sons.

PORTABLE TOOLS

77. A 48 page catalog listing the complete line of "Thor" portable electric tools. Description, specification and prices on electric drills, drill stands, hammers and many other electric tools and accessories included. Independent Pneumatic Tool Co.

SAFETY SWITCHES

78. A catalog covering the "Mongerson" line of enclosed safety switches. Includes ten pages of useful engineering data tables. Mongerson's Electrical Machine Works.

SWITCHBOARDS

79. A catalog featuring "Multumite Switchboard". Describes and illustrates a variety of steel enclosed switchboards and circuit breakers. Table of enclosure dimensions is included. I-T-E Circuit Breaker Co.

LUMILUX

80. A folder on the Lumilux, a lighting fixture for commercial use, with illustrations. Moe-Bridges Corp.

RECORDING INSTRUMENTS

81. A 20-page illustrated booklet entitled "Recording Instruments". Construction features are discussed. Tables show weight, power, consumption, supplies, mountings and wiring diagrams. Westinghouse Electric & Manufacturing Co.

SHOP ACCESSORIES

82. A leaflet illustrating and describing miscellaneous tools for the motor repair shop, including insulation testers, brushes, wire strippers, soldering tools, winding heads and other specialized equipment. Ideal Commutator Dresser Co.

TIME SWITCHES

83. A bulletin illustrating and describing time switches for poultry lights. Automatic Electric Manufacturing Co.

CONTROLLERS

84. Folder No. 89–9 on air-operated controllers. Several installations of this equipment are illustrated. Brown Instrument Co.

INTERIOR TELEPHONES

85. Bulletin 16, a catalog of interior telephone systems with illustrations and price list. L. J. Loeffler, Inc.

SURFACE WIRING

86. A leaflet featuring the "Surfex" line of surface wiring devices. Construction features, methods of connection, and wiring diagrams are shown. Pass & Seymour, Inc.

SWITCHES

87. Five bulletins on presenting new switches, with descriptions, illustrations, dimensions, ratings, application data and prices. Bulletin GEA–19 H, d.c. magnetic motor starting switch; Bulletin GEA–2907 on oil proof push button and selector switch; Bulletin GEA–2963 on TSA–14 automatic time switch; Bulletin GEA–2908 on "Alnico" limit switch with permanent magnet for snap action, and Bulletin GEA–743B on a.c. reversing drum controllers. General Electric Co.

INDUSTRIAL REFLECTOR

88. A folder illustrating and describing the Ivanhoe RLM silvered bowl diffuser, an industrial reflector designed to utilize silvered bowl lamps. Distribution curves and prices included. The Miller Co.

WELDING RODS

89. A pocket-size pamphlet containing brief data on physical properties and chemical analysis of weld metal deposited by each of the twenty odd electrodes in the Murex line. Metal & Thermit Corp.

CONTROLLING AND DISTRIBUTING APPARATUS

90. Catalog No. 383 consisting of 80 pages on safety switches, meter service switches, service equipment, lighting panels, distributing panels and cabinets, Kbl-duct and fittings, and Nofuze circuit breaker material. Bull Dog Electric Products Co.

EXPLOSION PROOF FIXTURES

91. Catalog sheets illustrating and describing a series of angle bracket type explosion proof fixtures. Dimensions, installation details and prices included. Benjamin Electric Mfg. Co.

CARBOLOY DRILLS

92. A six-page leaflet entitled "Drilling Holes 50 Per Cent Faster" describing carboloy tipped masonry drills for all types of non-metallic construction materials. Includes applications and instructions for using and resharping. Prices included. Carboloy Co., Inc.

GRAPHIC ARTS LIGHTING

93. A 14-page booklet describing and illustrating specific lighting for the graphic arts industry; covering arts, engraving, electrotyping, type setting, printing and bindery applications. Fostoria Pressed Steel Corp.

ELECTRICIAN'S GUIDE

94. A folder illustrating and describing an electrician's level and guide, and the "Clipper" supporting spacer. Michael J. Gallagher.

SERVICE CENTERS

95. Circular 176, an illustrated folder on multi-breaker service and load centers. Dimensions and specifications included. Trumbull Electric Mfg. Co.

LIGHTING FIXTURES

96. A catalog consisting of 96 pages with sections on residential, lumiline, brass chrome and china fixtures, also table lamps, with price list. Efcolite Corp.

STICKS TO ITS JOB

Only top quality fabric and adhesives are used in the manufacture of this tape. To make sure these high standards are always maintained, Graybar Amazon, Victor and Sticka Tape is constantly tested for strength, adhesion, endurance. It sticks to its job.

FRICTION TAPE (AMAZON-VICTOR-STICKA)

Distributed by **GraybaR**

OFFICES IN 85 PRINCIPAL CITIES. EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK

Central
RIGID STEEL CONDUIT
Protects
MANY OF THE NATION'S OUTSTANDING BUILDINGS

Sheathing the vital electrical arteries of such buildings as the Waldorf-Astoria Hotel of N.Y., the Fisher Building of Detroit, the Gulf Building of Pittsburgh and hundreds of similar outstanding institutions throughout the country, Central Rigid Steel Conduit measures up to the highest standards of installation and service. Every length bears the Underwriter's Laboratories seal of approval—every length is made to last as long as the building in which it is installed.

CENTRAL TUBE CO.
PITTSBURGH, PA.

THERE'S TESTED STRENGTH IN EVERY LENGTH

In the News

[FROM PAGE 100]

William A. Ross has been appointed sales manager and A. L. Berlin, assistant sales manager of the Pyle National Co., Chicago. Their headquarters will be at 1334–58 N. Kostner Ave., Chicago.

Norman L. Smith, for many years identified with the electrical business in Chicago, has been appointed sales manager of the electrical division of the Universal Motor Company, Oshkosh, Wis.

D. J. Baker and M. L. Landers of the Triangle Sales Co., Atlanta, Ga., have been appointed by the Triangle Conduit and Cable Co., of New York as representatives in the Southeast. Territory includes Georgia, Florida, Alabama, Mississippi, North Carolina, South Carolina and Tennessee.

Fred S. Kinsey, manager of the Middle-Western district, Lamp Division, Westinghouse Electric and Manufacturing Co., since 1929, has been appointed as manager of the Northeastern district, with headquarters at 150 Broadway, New York City.

The Bryant Electric Co. announces the appointment of Harold Hey as manager of wiring device sales. Mr. Hey has been eastern sales manager of the Bryant Electric Co. for the past three years. He will make his headquarters at Bridgeport, Conn.

The Mercoid Corp., announces the removal of its New York office from 90 West St., to the J. C. Penney Bldg., 330 West 34th St., with parking facilities and loading platforms at 333 West 33rd St.

Wilson Lighting Inc., Chicago, have leased an additional floor at 411–413 S. Clinton St.

General Electric Supply Corp. announces a lighting sales program which will include five traveling shows, staging performances in 75 key cities in October and at 300 trade and consumer meetings to be held throughout the country during the following six months. The illuminating laboratory, vapor lamp works and wiring materials division of the General Electric Co., and Curtis Lighting, Inc., Holophane Company Inc., and the Miller Company are cooperating with the G-E Supply Corp. in this program.

MAINTENANCE MEN seldom get a look at Aluminum meter cases. They don't need to!

Aluminum is not harmed by exposure to the weather; never needs painting. There is no rusting of the cases to streak the buildings on which they are mounted. Customers, whether in the country or in the city, appreciate the added sightliness where Aluminum meter cases are used.

You can obtain meter cases made of Alcoa Aluminum Alloys from various manufacturers. They are formed from Aluminum sheet, or die cast with required bosses, lugs and markings cast integrally, according to your specifications. We shall be glad to send you the names of manufacturers from whom Aluminum meter cases may be purchased. ALUMINUM COMPANY OF AMERICA, 2197 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA · ALUMINUM

ONE OF MANY

FEATURES THAT GIVE YOU A GREATER VALUE IN

SHAWMUT SHUR-LAG

RENEWABLE

FUSES

ASK ABOUT THEM

The **CHASE-SHAWMUT COMPANY**

NEWBURYPORT MASSACHUSETTS

More Gossip

Tell-tale Tests

Customers who quibble over the higher cost of a good small motor have but to see how much better a good motor checks up than a "gyp" make. For the past two years Johannes David Los van Haarlem, who operates the Standard Electric Motor Repair in Woodridge, N. J., had a "gyp" motor on hand for making comparative tests against his regular stock of motors. When the facts became known, there was no desire to buy the cheaper motor.

FISHERMEN M. R. Neil of the Neil Electric Company, electrical contractors, of Freeport, Ill. and A. W. Alberts, Rock River Electrical Supply Co. of Rockford, Ill. display the results of a fishing jaunt on Chippewa Flowage in Northern Wisconsin.

Code Artist

With large, hand-drawn diagrams on butcher paper to tell his story, city electrical inspector Harry V. Dobson, Santa Barbara, Calif., has been conducting group meetings of the contractors and wiremen in his city. The purpose is to acquaint them with the changes in the 1937 edition of the National Electrical Code. The diagrams make it possible to cover a great deal of territory in a short space of time.

Hudson Merchants

Across from the lofty Palisades, which line the Hudson River's New Jersey shore, lies Yonkers, N. Y., home of the Palisade Electric Co., Inc. Here T. J. Cook has established an attractive display of fixtures and appliances to support this pioneer company's residential service department.

MINERALLAC HANGER

Conduit 3/8"—2 1/2"
Cable to 2 1/8" (with Bushings)

MINERALLAC JIFFY CLIP

Sizes from .250" O.D. Tubing to 1 1/4" conduit.

See your Jobber

New York City Office
Theodore B. Dally
50 Church Street

MINERALLAC ELECTRIC CO.
25 N. Peoria St., CHICAGO

A SCREW DRIVER

and a

TWIST

. . . nothing else required to make a perfect joint with

The **MARR CONNECTOR**

Just pick up a post card and say "I'd like to try the MARR." We'll send a sample, FREE. No obligation.

Approved by Underwriters

THE RATTAN MANUFACTURING CO.

522 STATE STREET
NEW HAVEN, CONN, U. S. A.
GENERAL SALES AGENTS HATHEWAY AND CO.
220 CHURCH STREET NEW YORK, N. Y., U. S. A.

Light AND *Power*

ATOP WHITEFACE MOUNTAIN

...transmitted by

USS PARKWAY CABLES

WHITEFACE MOUNTAIN, New York World War Veterans Memorial Highway, near Lake Placid, New York. American Steel & Wire Company Parkway Cables will carry the power for pumps and lights at the toll house, pump house and shelter houses for years to come.

ADEQUATE WIRING SERVES AND SAVES

THOUSANDS OF FEET of Steel Taped Parkway Cables made by the American Steel & Wire Company, were installed at Whiteface Mountain, New York World War Veterans Memorial Highway. This project, located near Lake Placid, New York, in the beautiful Adirondacks, will provide scenic thrills to thousands of tourists. Whiteface is one of the highest mountains in this group, and the highway reaches to the summit almost a mile above sea level.

The Parkway Cable installed at Whiteface Mountain Memorial Highway is of the Metallic type. We also produce Amerseal Non-Metallic Parkway Cables. Both of these types are designed for direct burial in the soil without ducts, conduits, or other external protection.

Let our engineers save you money by specifying the Parkway Cable best suited to give years of faultless service. Our new catalog on Parkway Cables will be sent to you upon request.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

SO YOU WANT TO GIVE YOUR CUSTOMERS MORE OUTLETS FOR THEIR MONEY . . .

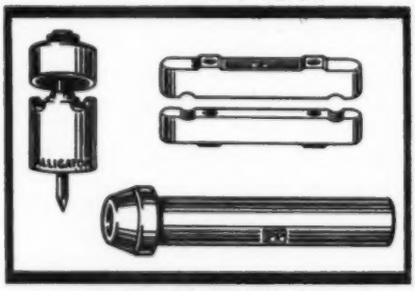
And Still Make More Money On Every Wiring Job!

There's nothing so certain to bring business your way as to show a prospect that you can give him more electrical outlets for the same installation cost as an ordinary wiring job. Wiring insulated with Porcelain Products' Knobs & Tubes (listed as standard by Underwriters' Laboratories' Re-examination Service) is the answer.

Porcelain Products' Knob & Tube insulated wiring is a material saver for you . . . and safer for your customer. You can *afford* to offer a better layout without reducing your usual margin of profit.

Your electrical wholesaler carries a complete line of Porcelain Products insulators and *PORCELETS* for porcelain insulated Knob & Tube wiring.

You may write us direct for descriptive matter and sales helps.



PORCELAIN PRODUCTS, INC.
FINDLAY, OHIO
PARKERSBURG, W. VA.

More Gossip

Reaching Motor Buyers

S. Schaffer of A. Werby & Co., Boston's pioneer motor dealers, reports personal letters to selected accounts the next best substitute for personal sales calls. Some how the less expensive multigraphed letter has failed to produce desired results. Therefore Schaffer sends fewer letters and picks his list more carefully.

NEW YORKERS—Bill Wheeler and Louis Freund pause in convention hall lobby at Detroit.

Theatre Specialist

Years of experience in the exhibition and distribution of moving pictures turned Ronald S. Kerr, of St. John, N. B., to specialization in the electrical contracting field. He recently established the Electrical Supplies, Ltd., making a specialty of outfitting picture theaters electrically. Particular emphasis is placed on planning and revamping lighting systems.

They Make Them Better

Some time ago Howard E. Van Alstyne decided that the Miller-Seldon Electric Company should give its Detroit customers the best tests possible on all small motor repair jobs. So a test board deluxe was built, and everybody praised it. Word got out about it. And soon Van Alstyne was tempted into selling this test outfit to a nation-wide small-motor repair concern. Other orders followed in quick succession, until this concern had standardized these testers in fifteen or more of its plants. Just another example of doing the job a little better than the other fellow.

EXPLOSION-PROOF FANS

Certified RATINGS — *Member* N A F M

DID YOU KNOW that proper ventilation with specially constructed AUTOVENT "31 Series" VAPOR-EXPLOSION PROOF PROPELLER FANS cut dust and fume hazards to a minimum and decrease insurance premiums?
Motors are class 1, group D rating, bearing Underwriters label. Fan blades are constructed of non-ferrous metal. Investigate AUTOVENT Safety Ventilation—write for Bulletin No. 201.

AUTOVENT FAN & BLOWER CO.
1815-21 N. Kostner Ave. Chicago, Ill.

"The Complete Line" of
FANS • BLOWERS • UNIT HEATERS

GEDNEY Fine FITTINGS

APPROVED GROUND FITTINGS

APPROVED ADJUSTABLE BONDING BUSHINGS

Write for details

Sole Sales Agent

HERON ELECTRIC SALES CORP. RCA BLDG., NEW YORK

Code Baseball

An interesting game has been devised by the Utah chapter, I.A.E.I., known as code baseball, suitable for any gathering of electrical inspectors, contractors or electricians. The rules are simple. Two teams are selected and an umpire questions each batter on a point of the code. If the correct answer is given the man advances to first base, if the answer is incorrect the batter is out. Three outs retire the side and runs are scored as in baseball.

The agile minds of entertainment committees may devise interesting variations for particular groups. But an authoritative umpire equipped with a 1937 revision of the code is a first essential.

SALES PACER—*When lumiline lighting was announced, Nat. Eglowstein of Newark sold the first big commercial job of this kind in that city. Now with fluorescent tubular type lamps available, the N. H. Eglowstein Co. will probably blaze the trail again. Nat recently showed the Newark boys that contractors can sell re-wiring with a demonstration circuit protective device, by landing a nice job within 30 minutes after he received his demonstrator kit. Commercial lighting and re-wiring jobs are Nat's specialty.*

Westchester Estimates

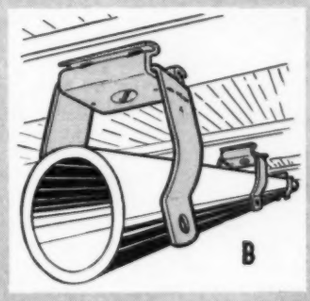
One of the busy residence wiring organizations in scenic Westchester County, the Cucinell Electric Co. of Yonkers, N. Y., takes its estimates seriously. According to Godfrey Bellavigna, take-offs are made of the materials required for various outlets to determine the job cost. No shortcut per-outlet "gestimating" here.

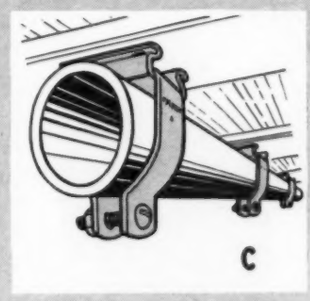
Setting Up Time

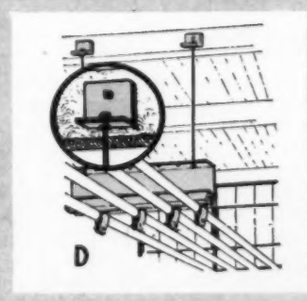
When the H. N. Crowder Jr. Co. wired the new Delaware River Bridge at Easton, Pa., the contract included setting 82 ornamental lighting standards. Joe Wilkins says his gang did the setting with a special truck in one day. The secret—a careful job was done on the templates which aligned the base bolts in the concrete bridge deck.

Flexibility...

Makes this Cleveland Conduit Hanger easy and quick to install!







● Since our recent introduction of this latest conduit hanging method, electrical contractors in several sections of the country have commented on its simple design and wide application. They have proved for themselves that the *Cleveland Conduit Hanger's* complete flexibility assures faster and neater wiring jobs of all types.

EXAMINE THESE ADVANTAGES:

1. The required number of clamps can be set before conduit is actually hung, as shown in figure A. This makes it unnecessary to handle too many units.

2. Pre-assembled runs of conduit can be hung loosely from the clamps in one preliminary operation, as illustrated in figure B.

3. After conduit is run, clamps can be tightened with single screw, as shown in figure C., thus giving a true, straight, rigid, completed job.

4. Parallel groups of pre-assembled conduit can be hung from *Cleveland Conduit Rail*, as pictured in figure D.

5. A complete stock of *Cleveland Conduit Hanging Equipment* suffices in hanging any type of wiring job. Extra fittings, brackets and temporary work are eliminated.

Write Today...

for full information on this innovation in conduit hanging . . . and its economical, efficient use in making your work more profitable!

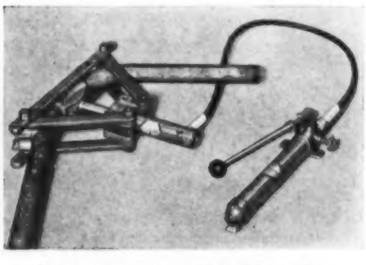
THE CLEVELAND SWITCHBOARD CO.

2927 EAST 79th STREET CLEVELAND, OHIO

EQUIPMENT News

Portable Conduit Bender

The Blackhawk line of Porto-Power hydraulic equipment includes kit S-30 for pipe and conduit bending, and kit S-31 assortment for factory maintenance work. The portable bender makes cold bends of 1-in. to 2-in. pipe sizes. The portable hydraulic power unit consists of pump, hose and ram that develops 10 tons of power from oil forced through a 6-foot flexible hose. Outfit weighs only 26 pounds. The S-30 kit includes bending shoes, for different pipe sizes, also other accessories. The S-31 industrial maintenance kit includes an assortment of extension tubes, couplings, clamps, chain and pusher heads to fit scores of industrial maintenance applications. Some of these are: straightening line shafts, pulling and pushing gears or pulleys, inserting or removing bushings, pins, bolts or shafts. Blackhawk Manufacturing Co., Milwaukee, Wis.



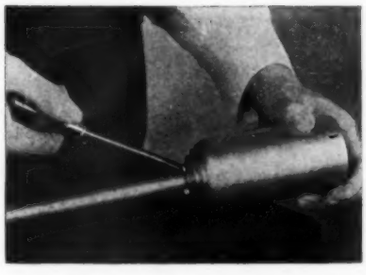
BLACKHAWK PORTO-POWER TOOLS

■

Solderless Lug

A clamping type lug, the "Varilug," fits a wide range of cable sizes with a minimum stock. Flattened U-bolt adaptable to many sizes of cable and also prevents damage to highly compressible flexible and extra flexible cables. Available in the form of angle lugs, T connectors, end-on-end joints, elbows, stud clamps, reducers and other forms all employing the flattened U-bolt principle. Burndy Engineering Co., New York, N. Y.

BURNDY VARILUG



WAKEFIELD FIXTURE STEM

Fixture Hangers

A new semi-rigid hanger design to simplify the shortening or lengthening of fixture stems. The special fitting on the top of the holder is tapped at an angle around the stem. Three thread cutting screws, bite into the metal of the cut stem. Construction provides ample over-load margin. For lengthening, an extension piece, internal coupling, and ornamental ring to hide the break, are used. The only tools required are a hacksaw and a screw driver. The F. W. Wakefield Brass Company, Vermillion, Ohio.

■

WAGNER TYPE RT MOTOR

Polyphase Motor

A new polyphase motor designed for low starting current, high starting torque and good speed regulation. Locked torque about twice full load torque and locked current from 3 to 3½ times full load current. Rotor carries a winding which is connected to the line when the motor is operating. Stator has two windings: a high resistance short circuited winding, and a low resistance insulated winding. Controlled by a two contactor, magnetic starter. First contactor acts as line switch and second contactor short circuits the low resistance winding after a definite lapse of time. Available in a large variety of ratings but ordinarily built in sizes 40 hp. and larger. For air conditioning service. Wagner Electric Corp., St. Louis, Mo.

WESTINGHOUSE TRANSFORMER

Voltage Transformer

The PV-130 portable voltage transformer is designed for use with portable instruments and recorders. Accuracy claimed within ¼ per cent on ratio and 20 minutes on phase angle under ordinary load and power factor conditions. Available in small size for primary voltages up to 2300 volts, and large size from 2300 to 6900 volts. Shell type construction is used. Terminals are mounted on moldarta terminal block which forms top panel on transformer. Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

■

Heavy Duty Controllers

Direct current controllers for machine tool applications, for heavy duty service below 10 hp. and general purpose above 10 hp. Definite time acceleration, unaffected by load or temperature, operates magnetically on the principle of a condenser discharge through a magnet coil. Features include new style case, snap-on cover, tilting panel frame, wiring trough, heavy duty contactors and heavy duty grid type resistors. Cutler-Hammer, Inc., Milwaukee, Wisconsin.

CUTLER-HAMMER CONTROLLERS

A WESTINGHOUSE SPECIFICATION MEANS LONG-TERM BUILDING INSURANCE

ELECTRICAL ADVICE

5c

Local phone calls quickly bring
"BUILDING-MINDED"
WESTINGHOUSE ENGINEERS

Westinghouse is as close to your office as your phone . . . and just as close to your projects wherever they may be located.

When Westinghouse products are used throughout the building, you need just one contact with an organization that goes all the way to satisfy both you and the building owner.

Electrical products must be closely interrelated. Hookups in which each product depends upon many others, call for equipment that operates as a unit. Westinghouse products for the building industry are designed and built for such teamwork. Ample proof of the performance of this type of installation is yours for the asking.

For every kind of electrical advice call local Westinghouse office or write Westinghouse Electric & Manufacturing Co., Dept. 7-N, East Pittsburgh, Pa.

Ask for your copy of the Westinghouse Data Book, containing helpful information on electrical products for buildings.

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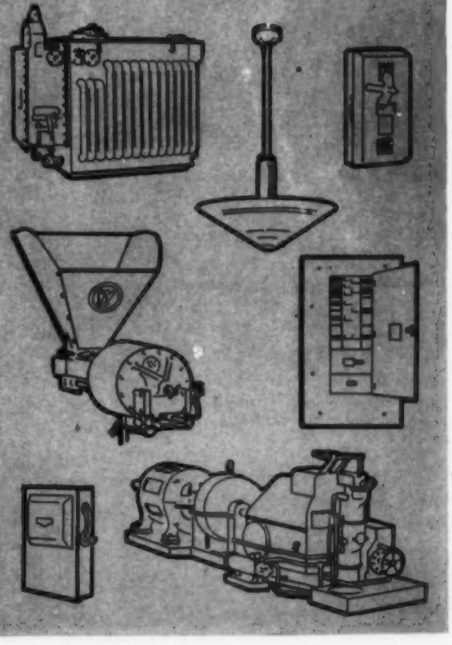
A FEW TYPICAL PRODUCTS IN THE COMPLETE WESTINGHOUSE LINE FOR THE BUILDING INDUSTRY



Westinghouse

Electrical Partner of the Building Industry

W WESTINGHOUSE ELECTRIC

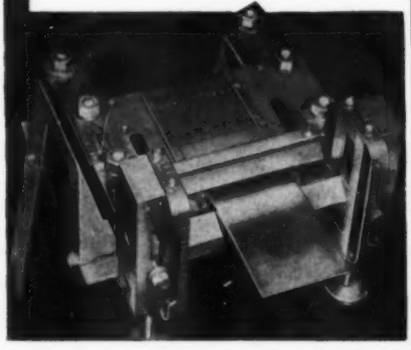
You Asked For It . . .

—And Here It Is!

The New "FARNEY" Four-Way Copper Bus-Bar Bender

"We want," you said, "a durable bus-bar bender that can

- take care of any practical bend that would ever be needed on a job.
- bend bars up, down, sidewise, and twist in any radius desired.
- bend short offsets, short form bends, Z-bends, close two bends, and perfectly match offsets in laminating copper.
- handle up to one-half inch copper bends.
- bend copper, aluminum, steel, and iron—absolutely without cracking.
- save at least 50% more time and man-power than any other bender on the market.
- straighten copper bends without cracking.
- be simple to operate, require no special training for workmen, and can be in working order within 10-15 minutes after mounting.
- be of light, yet extremely durable construction.
- be unconditionally guaranteed as to performance.
- be priced at a level equal to or within a few dollars of ordinary copper bus-bar benders."



Such jobs as the Carnegie Steel (Illinois), General Motors (Trenton, New Jersey), Consolidated Edison (New York City), Steel Tube (Brooklyn, New York) have shown without question of doubt that the new, amazingly efficient "FARNEY" four-way copper bus-bar bender performs each and every one of these strict requirements. An inquiry on your business letterhead will promptly bring full particulars and prices.

FARNEY TOOL & MACHINE WORKS
233 Broadway New York City

EQUIPMENT News

[FROM PAGE 124]

Outdoor Floodlights

High efficiency alzak aluminum outdoor floodlights for illuminating athletic fields and similar purposes. Uses 750 to 1500-watt lamps. Heavy gauge aluminum reflector with alzak finish. Adjustable mounting bracket of heavy galvanized casting permitting a wide range of vertical and horizontal adjustment in either cross arm or pole mounting type. Diameter is 18 in., height 20 in. Wilson Lighting, Inc., Chicago, Ill.

WILSON LONG RANGE FLOODLIGHT

Hand Tachometer

The "Jagabi" universal hand tachometer measures speeds from 30 r.p.m. to 40,000 r.p.m. with three tachometer ranges. Equivalent in speed coverage to former six-range tachometers by allowing indicating pointer to make two turns around the dial. Operates on fly-ball governor principle and includes ball bearings, knife edge pointer, rotating gear shifts and other refinements. Three-inch indicating dial. James G. Biddle Co., Philadelphia, Pa.

JAGABI TACHOMETER

The Badger

Synchronous Electric

TIME SWITCH
for successful and profitable installations

No wonder so many electrical contractors like to install Badger Time Switches. Dependable, accurate, simple in construction and built to give many years of satisfactory service, these time switches fully meet every need. It is generally known that they are easily installed and operate economically. Approved by the Underwriters' Laboratories. Reasonably priced. See your wholesaler or write for literature.

RELIANCE AUTOMATIC LIGHTING COMPANY
1937 MEAD STREET
RACINE, WISCONSIN

Connector

The Gedney connector has a self-adjustable floating grip, assuring full gripping surface at any angle. Pressure is spread over a wider area of the grip instead of screw-end, giving a tighter hold. The self-adjusting grip does not mar or cut insulation. It takes a wide range of cable sizes with maximum hold. Comes in one unit. Heron Electric Sales Corp., RCA Building, N. Y.

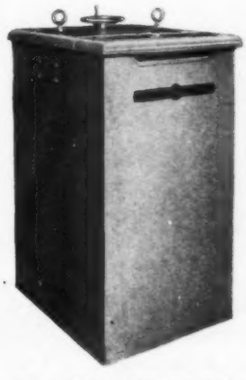
GEDNEY CONNECTOR

■

Wet Surface Paint

Paint compounded for direct application to surfaces wet from rain, fog, dew or condensation. Special ingredients react upon water as soon as the paint is applied absorbing all moisture while painting. The moisture together with the special ingredients are carried through to the surface of the paint film where they evaporate completely. Also suitable for iron, steel and other metals, and on dry surfaces. Wet-X-Hale Paint Compound Co., New York.

■



G. E. HYDROGEN WELDER

Arc Welder

Atomic-hydrogen arc welding equipment, for special alloys and thin sections. Produces a uniformly strong weld of smooth appearance. In operating, a.c. arc is maintained between two adjustable tungsten electrodes while hydrogen gas is fed to the arc around the electrodes. Equipment combines in a compact portable unit, with convenient terminals and pipe fittings for connection to electrode holder, power supply and hydrogen source. Wheel at top controls continuously variable reactor giving stepless current adjustment. An ammeter indicates the current. Drip-proof enclosure, with ventilation through end louvres, and lifting eyes. General Electric Co., Schenectady, N. Y.

For your new and rewiring jobs, you will find it to advantage to use

ROME CABLE
BUILDING WIRE

We manufacture code, intermediate, 30% and super aging.

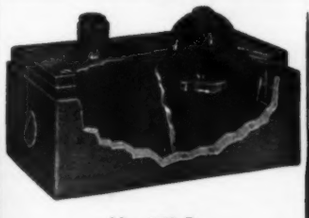
All approved by the Underwriters Laboratories, Inc. N.E.C.S.

Flame and moisture resistant.
Slick finish for quick and easy pulling.
Long aging rubber.
Uniformly small diameters.
Clean—easy stripping.
Eight clear distinct colors.

ROME PRODUCTS
Hot rolled rods, bare and tinned copper wire, bare and tinned strand, U.R.C. weatherproof wire, cotton, paper and asbestos magnet wire, rubber insulated wires and cords, lead covered cables.

SALES OFFICES
New York, Chicago, Philadelphia, Pittsburgh, Richmond, Cleveland, Boston, Los Angeles.

FLOOR BOXES and WIRING SPECIALTIES



No. 252-R
TWO GANG BOX

Two gang Adjustable Floor Box with No. 208 Receptacle in one section. One cover plate with ½" Flush Brass Plug and the other cover plate with 2" Flush Brass Plug.

No. 284 DUPLEX RECEPTACLE NOZZLE

With ½" brass pipe extension. Neatest and most compact fitting obtainable. Also available with ¾" pipe extension. Fullman also offers Duplex Telephone Nozzles.

Sell and install LATROBE—the complete line for residential, commercial and industrial work.
Catalog on request

FULLMAN MFG. CO.
LATROBE · PENN.

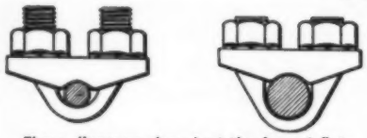
No. 130 "LATROBE" ADJUSTABLE WATER TIGHT FLOOR BOX

No. 130 Box with No. 207 Bell Nozzle. Cut-away view illustrates how tapered unit receptacle fits tapered opening in adjustable ring. Design eliminates many small parts. Cover plate 3½" — overall height 3½".

BURNDY
V
line

VARI-LUG
Type VA

7 sizes take all conductors from No. 8 Str. to 2000 Mcm.



These diagrams show how the forged flattened V-bolt, a VARILUG feature, takes cables of various sizes.

See pages 26 to 29, Catalog No. 33C, for full descriptions of Burndy Vari-Connectors.

BURNDY
ENGINEERING COMPANY, Inc.
459 EAST 133rd. ST., NEW YORK, N.Y.

Do you want to get MORE Rewiring, Motor Service and Repair JOBS

Show owners, exact condition of wiring with the

NEW "DM" "3 in 1" MEGOHMER

with
TRIPLE COLOR GRADING SCALE

Like a tube tester, it classifies wiring as good, fair or doubtful. A scientifically accurate selling tool, to help you make more money. Send for description TODAY.

HERMAN H. STICHT & CO.
Dept. 53, 27 Park Place, New York
Send Bulletin 1723

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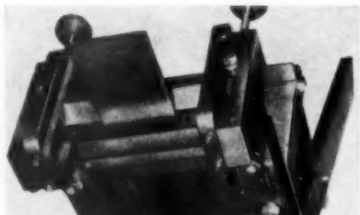
1038

EQUIPMENT News

[FROM PAGE 127]

Bus Bar Bender

The Farney four-way bender for copper bus bar bends up, down, sideways, and twists in any radius desired. It bends short offsets, short form bends, Z-bends, closes two bends and matches offsets perfectly in laminating copper. Handles up to one-half inch copper bars. Also bends or straightens copper, aluminum, steel and iron without cracking. Simple to operate, requires no special training for workmen, can be made ready within ten to fifteen minutes after mounting. Farney Tool & Machine Works, 233 Broadway, New York, N. Y.



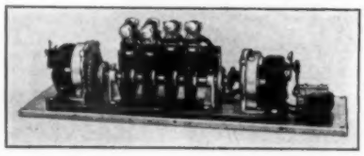
FARNEY BUS BAR BENDER

■

Soldering Flux

A new non-corrosive soldering flux for brass, tin, bronze and copper, designed for fast soldering on a mass production basis. Thorough and quick joint penetration and increased production. Extra speed is given on reasonably clean metal surfaces. The Ohio Carbon Co., Cleveland, Ohio.

■



STALEY RECYCLING CONTROLLER

Cycle Control

A two-speed time cycle controller formultiple electric circuit operation. Model 635 controller utilizes various speeds on its single cam shaft. Motors with different speeds are placed at either end of the cam shaft and, utilizing speed reducers and over-riding clutches at proper places on the shaft, the cycling operation is accelerated or slowed at any point desired in the cycle. Circuits are controlled by unbreakable, clipped-in mercury switches. Electric Switch Corporation, Columbus, Indiana.

Always on the job . . .

TORK TIME SWITCHES
ALL-ELECTRIC

191 SP
1650 Watts
List $12.75

962 DP
4000 Watts
List $15.00

BUY through your JOBBER
Send for your copy
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The TORK CLOCK CO., Inc.
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VICTOR
"FORCE AIR"
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Complete Line
6" to 28"

★ ★

Equipped with Victor's Super-Powered Motors

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Rugged Construction

Trouble-free performance

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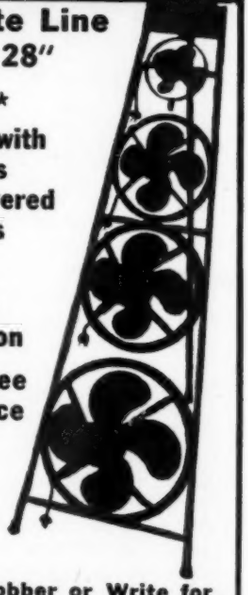
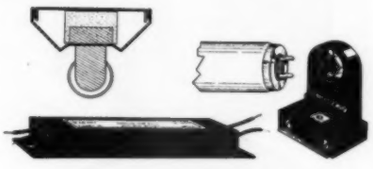


Ask Your Jobber or Write for Catalog to
VICTOR ELECTRIC PRODUCTS, INC.
807 Reading Road Cincinnati, Ohio

Fluorescent Tube Accessories

The Daybrite line of lighting fixtures includes units designed to accommodate 18-in., 24-in. and 36-in. fluorescent tubular lamps, with integral auxiliary equipment and the special sockets required for inserting the pin-type lamps. Fixture units are made in various styles including open-tube surface designs, reflector-channel, drop-skirt, cove strips and case lighting assemblies. Most types may be had completely wired with auxiliary devices in place, ready to mount over flush outlet boxes. Daybrite Lighting, Inc., St. Louis, Mo.

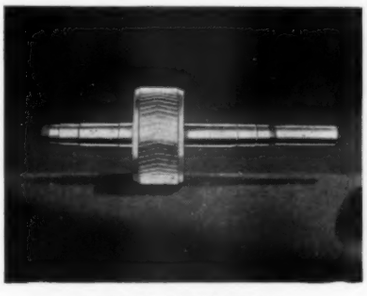


DAYBRITE FLUORESCENT FIXTURES

■

Enclosed Motor

A line of totally enclosed induction motors with patented herringbone rotor. Constructed of solid one piece cast shell frame with laminations welded into place. Mica-Bestos insulation and solid, one piece, cast aluminum rotor dynamically balanced. Sterling Electric Motors Inc., Los Angeles, Calif.

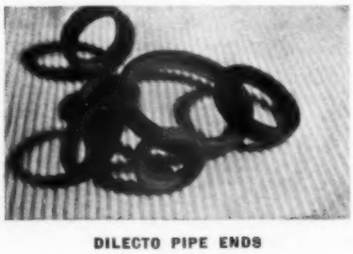


STERLING KLOSD MOTOR

■

Insulating Bushings

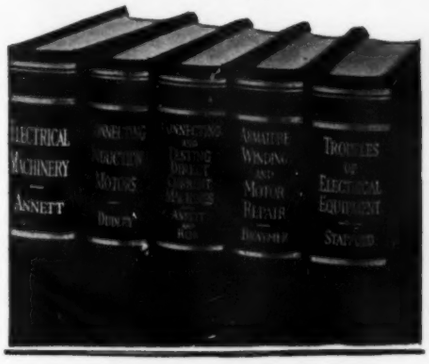
Molded laminated plastic bushings with high insulating properties and high mechanical strength. Unaffected by water, steam, chemicals or chemical fumes. Made in two styles, threaded to fit standard pipes, or plain with set screws for fastening. Available in ½-inch to 4-inch pipe sizes. Continental Diamond Fiber Co., Newark, Delaware.



DILECTO PIPE ENDS

Every phase of electrical maintenance and repair work covered in this *new* Library

5 volumes of practical how-to-do-it information



Every man concerned with the care and repair of electrical machinery should have these practical books, with their helpful tables, diagrams, data, methods and kinks. Every one of the five volumes is jammed to the covers with sound, how-to-do-it information—the kind you have to have when anything goes wrong. Liberal use has been made of practical data and practice in repair shops so as to combine the good features of a library of methods with handbook information covering these methods.

Electrical Maintenance and Repair Library

5 volumes—2042 pages—1721 illustrations

IN these books will be found answers to practically all the repair and winding problems that the electrician will meet in actual practice.

The books discuss direct and alternating current windings—repair shop methods for rewinding armatures—commutator connection—the testing of armature windings—the testing of induction motors for faults—practical ways of reconnecting induction motors—commutator repairs—correct brush troubles, etc.

They tell you how to inspect and repair motor starters and generators—how to diagnose motor and generator troubles—how to figure new windings for old cores on induction motors.

You learn about three-wire systems, starting rheostats, transformers and starting polyphase motors, etc.

They give you scores of practical methods used by electrical repairmen to solve special problems.

New trouble-shooting and repair book now included in Library

Now, in addition to four well-known practical books on all details of testing, connecting, rewinding, installing and maintaining electrical machinery, the Library of Electrical Maintenance and Repair includes Stafford's *Troubles of Electrical Equipment,* a new book full of helpful maintenance information special trouble-shooting charts, explanation of symptoms and causes of machinery troubles, specific remedies, etc. This revised library helps you to know the why as well as the how of electrical maintenance and repair work, gives you the ability to handle bigger jobs with surety of results.

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You can secure the use of these five great books on electrical repair work for *ten days' free examination.* When you have seen for yourself what these books are and how much they can help you, send us your first remittance. The balance may be paid in monthly installments of $2.00 until the price of the library is paid. Send for the books today. Fill in and mail the Free Examination Coupon.

McGRAW-HILL BOOK COMPANY, INC.
330 West 42d Street, New York, N. Y.

Send me the Electrical Maintenance and Repair Library (5 vols.), postpaid, for 10 days' free examination. Within 10 days of receipt I will send $1.00, and $2.00 monthly until $15.00 is paid, or return the books postpaid.

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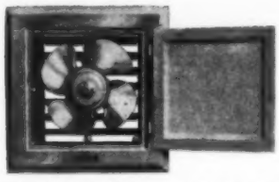
(Books sent on approval in U. S. and Canada only.)

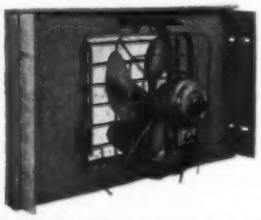
Don't overlook this important and profitable market! Signal Kitchen Ventilating Fans are not expensive—the reason for their popularity.



Automatic Wallbox built-in model for permanent installation—adjustable to wall thickness. Has a 10-inch quiet type fan. List price $32.00.

Kitchen Ring-type Vent Fan, so light it can be mounted on wall board. Has 10-inch quiet type polished aluminum fan. Mounting ring is cast aluminum. List price $16.50.

A 10-inch fan for permanent installation—a built-in type similar to the adjustable vent fan. Lever operates weatherproof shutters. List price $18.50.



Kitchen adjustable type vent fan has 10-inch quiet type fan. Fits windows 24" to 37" in width. Equipped with weatherproof shutters. List price $18.50.

Send for complete catalog on this profitable line.

SIGNAL ELECTRIC MFG. CO.
MENOMINEE, MICHIGAN

Offices in all principal cities.

SIGNAL

EQUIPMENT *News*

[FROM PAGE 129]

Hand Tachometer

A hand tachometer with total range of 40 to 50,000 revolutions per min. equipped with 2 7/8-inch dial. Fixed reading device operated by push button permits dial reading to be held. Accessories include rubber point, steel point, funnel center, thread, cutmeter wheel and extension bar. Indicates in rpm. on single scale for all three ranges. Housed in bakelite case. O. Zernickow. New York, N. Y.

O-Z HAND TACHOMETER

■

Duct Type Ionizer

An ionizer for installation in the return, intake or fan chamber of the duct system for heating, ventilating or air conditioning system. Ozonates and deodorizes air passing through the ducts. A carburetor which dispenses essential oils such as pine needle, may be attached. Lowell Air Conditioning Corp., Philadelphia, Pa.

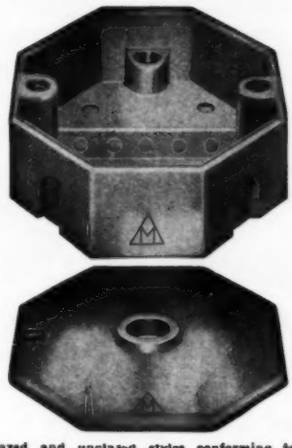
LOWELL IONIZER

Profit by USING

ILLINOIS

Dependable Porcelain

OUTLET BOXES



★Glazed and unglazed styles conforming to all existing standards of dimensions, spacing, position of knockout holes, and mounting screws. High mechanical and electrical efficiency.

Contractors who use these products not only establish themselves most securely with their customers but also build their business by making each job a true quality one. Send for bulletin.

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILL.

Business cards on book form stock made by Wiggins, zip from a pad with perfect edges. Carried in a leather case, they are ideal for salesmen.

That vital first impression!

It is here that sales are made or un-made before salesman or buyer knows it. And if it is what you want it to be, the man you are soliciting will always be "in"—and he won't rule your figures out if they're not the lowest.

A first impression by a salesman who presents a *Genuine Engraved* business card done by Wiggins often says more about a firm's integrity or the quality of its product than a dozen preliminary letters.

We will gladly quote on any quantity of business cards. Send a sample of what you are now using.

The John B.
WIGGINS *Company*
1173 Fullerton Avenue Chicago
Engravers since 1857

Picking Service Customers

[FROM PAGE 16]

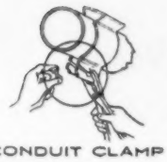
nearby church gets attention four times a year. A local bank has the Schuck Company go all over its floodlighting installation every four months. An apartment house has a semi-annual inspection made of its fire alarm equipment. Another church has an elaborate set of electrically operated chimes gone over each three months. Regular jobs of this sort are set ahead in a date file, with the details recorded on 3 by 5 cards. Being staggered along during the year, they provide a regular flow of fill-in business.

George Schuck is alive to the contractor's service possibilities. He has trained his staff to welcome all kinds of small orders, whether to repair fixtures, replace old switches and receptacles, to remodel some table lamps, add an outlet, or to shoot trouble in a home or store. For it brings other business. For example, Schuck once sold two 200-watt fixtures to a tough prospect who looked almost hopeless. This sale soon led to a $20,000 factory wiring job for this same person. Again one day at store-closing time a lady phoned for an attachment plug—one of those nuisance calls. It seems she had bought an expensive floor lamp for a party she was giving, but the plug would not fit her old Chapman receptacles. Schuck postponed his supper and equipped the lady's lamp so it could be used. It was a 25-cent "nuisance" transaction. But within 30 days, this customer had spent $700 at the Schuck store for silk shades to match a new decorative scheme. And she later bought a washing machine and other appliances.

Schuck says it is all a case of taking care of many small orders on the basis of quality and good service. His modern establishment and smooth-functioning organization proves that it can be done at a fair profit.

Short-Week Competition

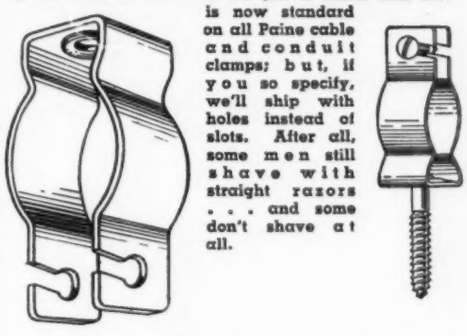
The trend toward shorter hours and less working days per week hurts community service organizations such as electrical contractors, plumbers and painters, says Ray C. Kuhns, electrical contractor of Lehighton, Pa. Too much spare time encourages plant mechanics with experience in such trades to take on fill-in work on the outside, and usually at ridiculously low prices. Wiring, plumbing and painting jobs are done over week ends or by piecemeal during the week, just to make small additional wages.


CONDUIT CLAMP

JUST *TWO* HANDS

instead of the old "three hand" way

"Brain Sweat" beats "brawn sweat." This patented slot in the new, improved Paine conduit and cable clamps proves it. The old, "three hand" fumbling way is in the discard because, now, you merely slip the bolt, *with nut already on it*, into the clamp slot, tighten the nut . . . and the job is done. This slot is now standard on all Paine cable and conduit clamps; but, if you so specify, we'll ship with holes instead of slots. After all, some men still shave with straight razors . . . and some don't shave at all.



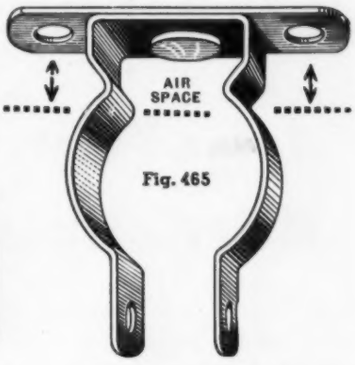


Fig. 465

SEE THAT AIR SPACE?

It's an important Paine feature . . . a standard air space between conduit and wall, ceiling or floor. It's a genuine wrinkle remover when you come to a damp or wet place in the installation line.

FIG. 445—Conduit Clamp
Users say it's the best they've ever tried—so snug fitting and easy to use. Like all Paine clamps, it is fitted with cadmium plated nut and bolt of the right size for the clamp ordered.

FIG. 485—Cable Clamp
Preferred for cross arms, poles and similar work. May be used with lead shield. Is gimlet pointed and accurately threaded and is really put together for secure, lasting installations.

FIG. 465—Flat Base Cable Clamp
Has a wide, flat base with round hole at each end—a most accurate, snug fitting clamp, giving universal satisfaction. Have it either way . . . with Paine patented slots or round bolt holes as specified.

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It Hammers—up to 1⅛" diameter holes in concrete when using a hollow drill. Will drill ½" hole 4" deep in one minute. Use it for drilling holes in concrete or brick for anchoring expansion bolts, for scaling rust, channeling, seaming, vibrating, bush-hammering, caulking, etc.

It Drills—up to 5/16" diameter holes in steel, 1⅛" in wood. Every shaft mounted on precision oil-seal, dirt-proof ball bearings. Helical cut, alloy steel gears. ⅜" heavy duty Jacobs key chuck.

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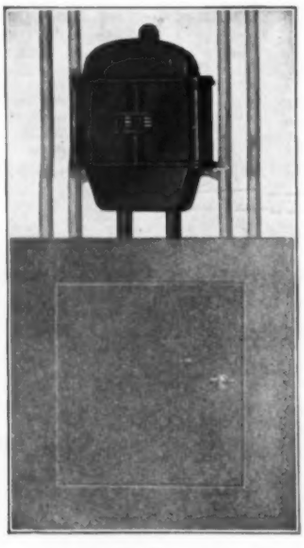
Industrials will be interested in the advantages of obtaining more than one voltage from one service, and the proper voltage for each type of apparatus. Sorgel Air-Cooled Transformers are best for this purpose.



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'American Transformer Co..... 88
Anaconda Wire & Cable Co..108, 109
*Arrow-Hart & Hegeman Elec. Co. 101
Art Metal Co..... 50
*Automatic Elec. Mfg. Co..... 52
*Autovent Fan & Blower Co..... 122
*Benjamin Elec. Mfg. Co.....66, 67
*Briegel Method Tool Co..... 114
Bryant Electric Co..... 68
Bull Dog Electric Products Co.. 91
Bunting Brass & Bronze Co..... 112
*Burndy Engineering Co.. 128
*Bussmann Mfg. Co.....77, 95
Central Tube Mfg. Co..... 118
Chase-Shawmut Co..... 120
Clark Controller Co., The..... 111
Cleveland Switchboard Co..... 123
*Co-op. Electric Supply Co 132
*Crescent Insulated Wire & Cable Co. 99
*Curtis Lighting, Inc..... 39
*Cutler-Hammer, Inc..... 27
Economy Fuse & Mfg. Co..... 81
Everstick Anchor Co..... 79
*Fairbanks-Morse & Co..... 113
Faries Mfg. Co..... 82
Farney Tool & Machine Works.... 126
Fibre Conduit Co., The..... 59
*Fullman Manufacturing Co..... 127
*General Cable Co..... 78
*General Electric Co. (Bridgeport) Back Cover
*General Elec. Co. (Nela Pk.).... 41
*General Electric Co. (Schenectady) Inside Front Cover
Goodrich Electric Co..... 28
*Graybar Electric Co.....57, 86, 118
*Greenlee Tool Co..... 98
Habirshaw Wire & Cable Corp..62, 63
*Hartman, B. 132
*Hazard Insulated Wire Works.... 93
Heron Elec. Sales Corp..... 122
*Herwig Co., The..... 47
Homer Commutator Corp..... 114
Hubbell, Inc., Harvey.....60, 61
ILG Electric Vent. Co..... 58
*Illinois Electric Porcelain Co..... 130
*Ilsco Copper & Tube Products, Inc. 132
Insulation, Inc..... 110
Jefferson Elec. Co..... 74
Kent Metal Mfg. Co..... 47
Linde Air Products Co., The.... 114
*McGill Mfg. Co..... 69
McGraw-Hill Book Co... 129
Milwaukee Elec. Tool Co..... 131
*Minerallac Electric Co..... 120
*Multi Elec. Mfg. Co..... 47
*National Carbon Co..... 72
*Okonite Co..... 102
Overbagh & Ayres Mfg. Co..... 52
*Paine Co. 131
Pass & Seymour, Inc.....64, 65
*Porcelain Products, Inc..... 122
*Quadrangle Co. 53
*Rattan Mfg. Co..... 120
*Reliance Automatic Lighting Co.. 126
Ridge Tool Co., The..... 112
*RLM Standards Inst., Inc..... 107
*Rome Cable Co..... 127
*Sangamo Electric Co..... 43
Schwarze Electric Co..... 75
*Sherman Mfg. Co., H. B..... 76
Signal Elec. Mfg. Co..... 130
*Sorgel Elec. Co..... 132
*Square D Company Inside Back Cover, 84
*Steel & Tubes, Inc 70, 71
*Sterling Reflector Co..... 49
Sticht Co., H. H..... 128
Thomas & Betts Co., The..... 85
*Tork Clock Co., The..... 128
*Trumbull Elec. Mfg. Co., The.... 80
Union Carbide and Carbon Corp.. 114
*United States Rubber Products, Inc. 89
*U. S. Steel Corp..... 121
Victor Elec. Prod. Co..... 128
*Wadsworth Elec Mfg. Co..... 2
*Walker Electrical Co..... 100
*Ward Leonard Elec. Co..... 110
Webster Electric Co..... 73
*Westinghouse Elec. Mfg. Co.. 45, 125
Wiggins Co., J. B..... 130
*Wiremold Co., The.....34, 35
Youngstown Sheet & Tube Co.... 4

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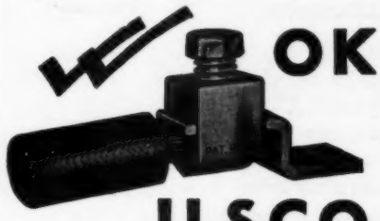

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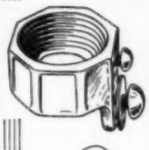

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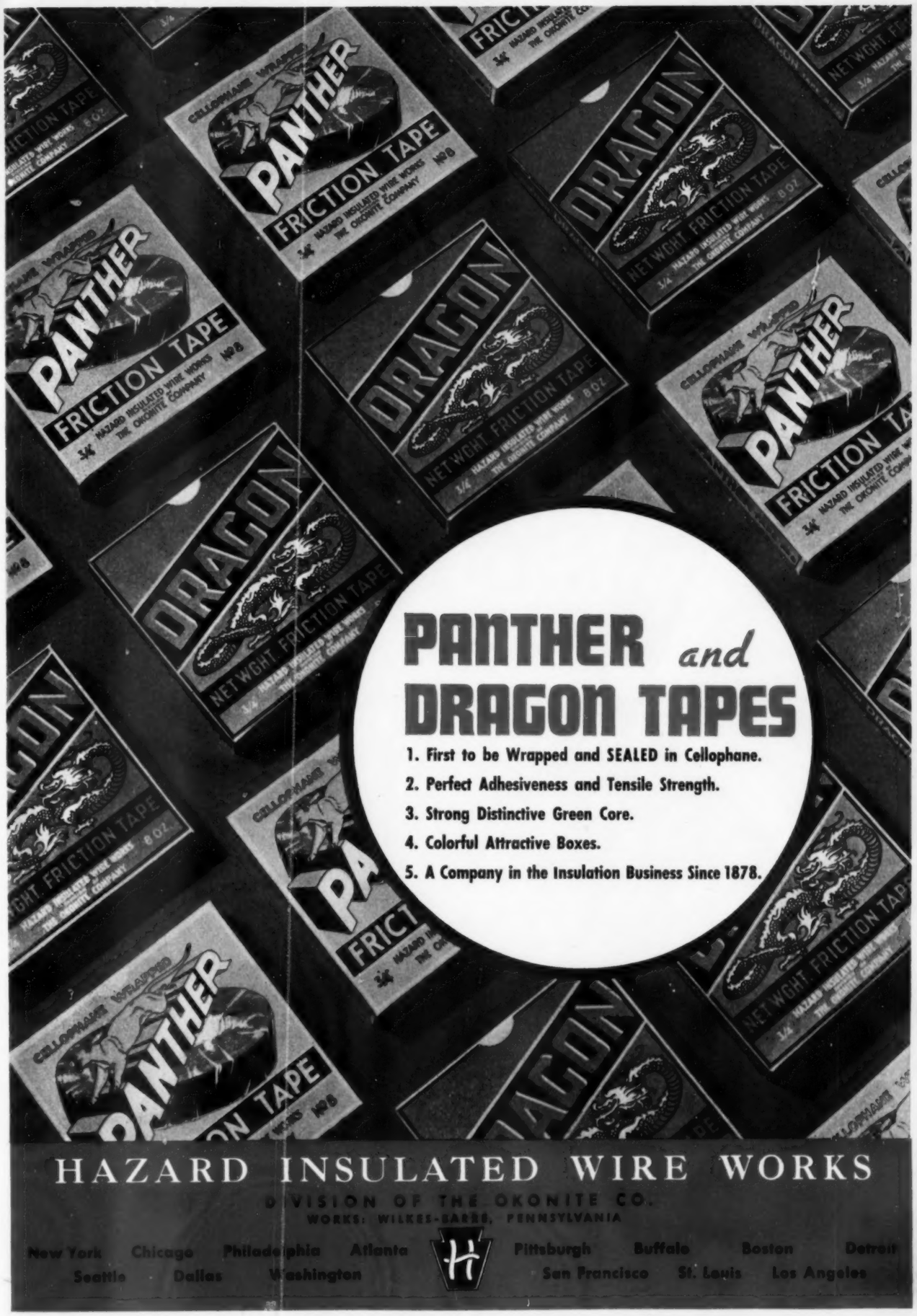

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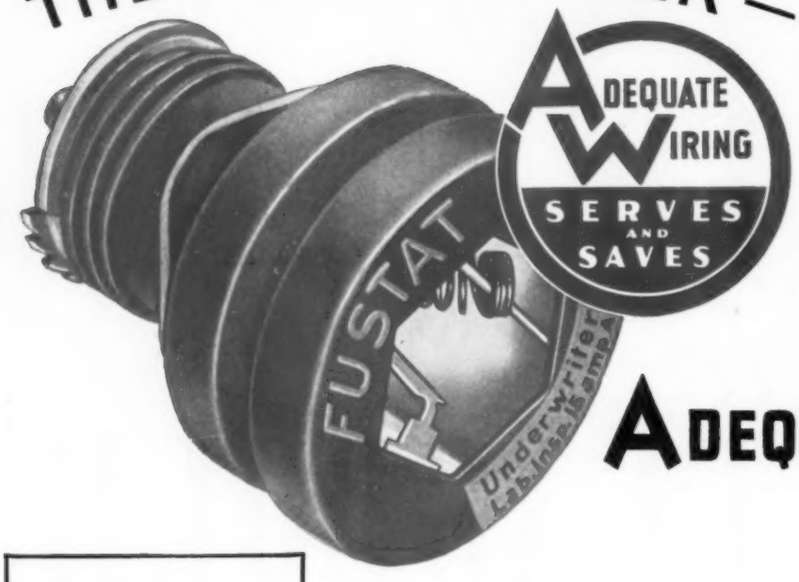

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Adequate wiring means —
more appliances in use

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